

Software User's Guide



Version 1.2

Product #7871

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved in writing by Davis Instruments may void the user's authority to operate this equipment.

Product Number: 7871

Davis Instruments Part Number: 7395-075

GroWeatherlink®, Version 1.2

Rev. C Manual (July 16, 1999)

Controlled online: DI:Wx:Software:GroWeatherLink

This product complies with the essential protection requirements of the EC EMC Directive 89/336/EC.

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Software User's Guide



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• *For Windows™*
•
• *Version 1.2*

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Welcome to Davis Instruments' GroWeatherLink Software. The WeatherLink and software allows you to connect your personal computer to GroWeather™ stations to store, view, plot, export, and print the weather data gathered by the station.

CONTENTS OF PACKAGE

Before proceeding, please check to make sure your GroWeatherLink package contains the following:

▲ **PC COM Port Adapter**

The PC COM port adapter is a 9-pin connector with an RJ connector jack in one end. Use the PC COM port adapter to connect the WeatherLink to a 9-pin serial port.

▲ **40 feet (12 m) WeatherLink Cable (4-conductor)**

▲ **WeatherLink Isolator Unit**

The isolator unit provides upgraded protection against the electrical disturbances caused by ground offsets or static charges by placing an optical connection between the WeatherLink and your computer. Since electrical disturbances cannot travel across the optical connection, the isolator unit will help prevent lockups of the station console and possible damage to the console, WeatherLink, and PC.

▲ **Loopback connector**

The loopback connector is a short piece of wire with a cable plug at one end and a red plastic cap at the other. The loopback connector can be used to determine what serial ports are available for the WeatherLink (see "Finding the Correct Serial Port" on page 23).

▲ **WeatherLink Software Diskette**

- **INTRODUCTION**
- *Contents of Package*
-
-

There are three basic types of installations: direct connection, phone modem connection, and radio multi-point connection.

▲ **Direct connection**

Involves connecting the GroWeatherLink/ET Data Logger (simply referred to as “WeatherLink”) directly to your computer. Direct connections include installations that use Davis’ Short-Range Modem Pair (#7875) and/or a base and station (i.e., single-point) radio.

▲ **Phone modem connection**

Refers specifically to any installation where the WeatherLink is connected to a telephone modem and a second modem is connected to your computer.

▲ **Radio multi-point connection**

Refers to installations where more than one station transmits WeatherLink data to your computer via radio modem.

Note: If you have not yet purchased a remote communications device—such as a telephone or radio modem—and you would like to know more about the various options, contact our tech support team (at 510-732-7814) and ask for the “WeatherLink Radio Communications” application note.

HARDWARE REQUIREMENTS

The required hardware differs depending on whether you are attempting to make a direct connection, phone modem connection, or radio multi-point connection.

Direct Connection Hardware Requirements

In addition to the provided hardware, check that you have the following items.

▲ **GroWeatherLink/ET Data Logger**

▲ **Computer running Windows™ 3.1, NT, or 95 with at least 5 MB of free disk space, 4MB of RAM, and one free serial port**

The amount of space necessary for the data files depends on the archive interval. Database files containing data stored at a 30-minute archive interval require approximately 64K of disk space per month of data. The file size changes in a linear fashion depending on the archive interval. For example, data stored at a 1 minute interval requires approximately 1.92 MB/month while the data stored at a 2 hour interval requires approximately 16K/month.

▲ **Short-Range Modem Pair (SRM)—optional**

For transmitting data over twisted-pair cable at a distance of up to seven miles (11 km). SRM (#7875) and twisted pair cable (#7884) available from Davis.

▲ **Radio—optional**

You may use a third-party radio to transmit data from the WeatherLink to the PC or SRM. Davis offers an installation kit for two such radios (see “Radio Multi-Point Connection” on page 9 for more information). May also require Alarm Output Module to conserve power.

• **Phone Modem Connection Hardware Requirements**

In addition to the provided hardware, check that you have the following items.

- ▲ **GroWeatherLink/ET Data Logger**
- ▲ **Computer running Windows™ 3.1, NT, or 95 with at least 5 MB of free disk space, 4MB of RAM, and one free serial port**
See “Direct Connection Hardware Requirements” on page 3 for an explanation of hard disk requirements.
- ▲ **One external modem to connect to the WeatherLink**
The modem must be Hayes® compatible and run at either 1200 or 2400 baud.
- ▲ **One internal modem or external modem connected to your computer**
The modem must be Hayes compatible and run at either 1200 or 2400 baud.
- ▲ **Telephone Modem Adapter**
The Telephone Modem Adapter (#7870) provides the connection between the WeatherLink and the modem.

Radio Multi-Point Connection Hardware Requirements

In addition to the provided hardware, check that you have the following items.

- ▲ **GroWeatherLink/ET Data Logger**
- ▲ **Computer running Windows™ 3.1, NT, or 95 with at least 5 MB of free disk space, 4MB of RAM, and one free serial port**
See “Direct Connection Hardware Requirements” on page 3 for an explanation of hard disk requirements.
- ▲ **Spread spectrum or UHF radio modems for each weather station and base station**
Davis recommends some excellent third-party radio modems: YDI Spread Spectrum Radio Modem (available at YDI, #910-DAVIS), and RF Neulink UHF radio modem (available at RF Neulink, #9600).
- ▲ **One Antenna/Installation Kit for each radio modem - optional**
The Antenna/Installation Kits include the hardware necessary to connect a radio modem to a WeatherLink data logger at the field site or to a personal computer at the base site.

LABELING YOUR CABLES

Use the label sheets provided with your GroWeather to mark your WeatherLink cables before you begin installation. ***Make sure you label every cable end, including extension cables.*** Doing this now will help prevent confusion during the installation and if you ever need to disconnect a cable at a later date.

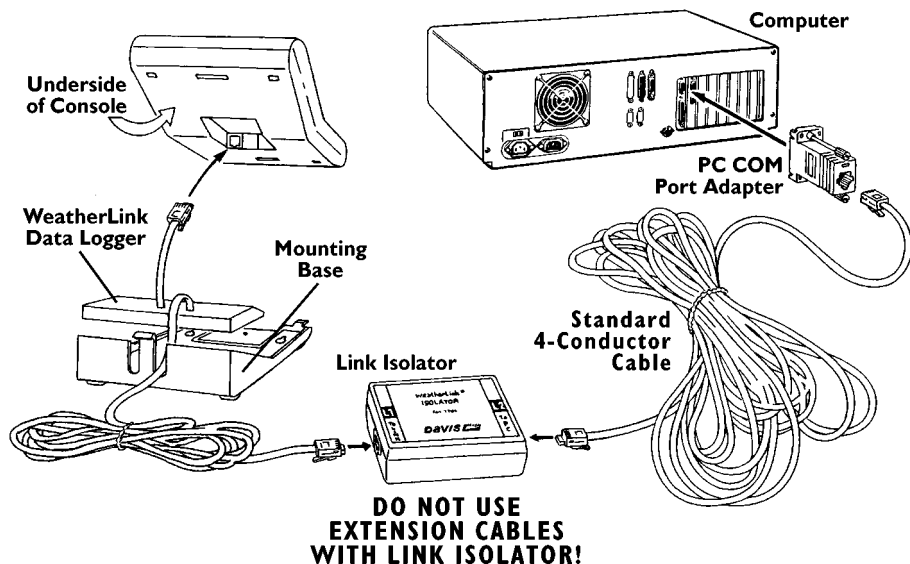
- ▲ **Place the C3/LINK label on the end of the short cable coming from the WeatherLink.**
- ▲ **Place the LINK/L1 label on the end of the long cable coming from the WeatherLink.**
- ▲ **Place a L2/LINK to PC/PC label on each end of the 40-foot (12-m) WeatherLink cable.**
This cable runs from the isolator unit to the computer or external modem. On one end of the cable, orient the label so L2 is closest to the end of the cable. On the other end, orient the label so PC is closest to the end of the cable.

DIRECT CONNECTION

The instructions below explain how to make a typical direct connection. Also included is an illustration showing how to make a direct connection using the SRM.

Typical Direct Connection

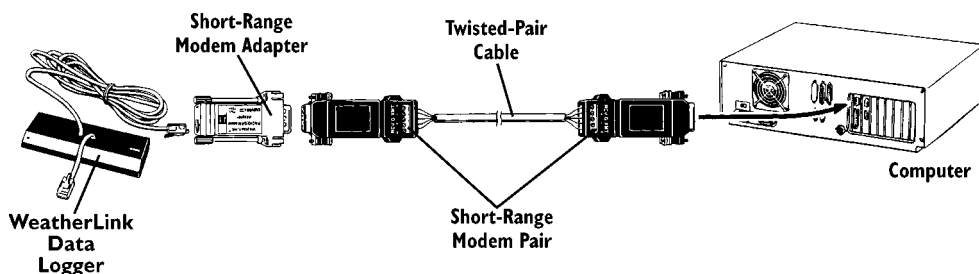
The instructions below explain how to make a typical direct connection, using only the hardware and cables provided. **You may not use extension cables with the Link Isolator**, meaning that the WeatherLink must be within 48' of the PC.



TYPICAL DIRECT CONNECTION

Short-Range Modem Pair (SRM) Direct Connection

If you want to locate the console more than 48' (14.5 m) from the computer you will need to use the SRM. Specific instructions for connecting via the SRM are contained in the SRM manual.



SHORT-RANGE MODEM PAIR CONNECTION

Note: You do not need the Link Isolator when connecting via the SRM.

• **Direct Connection Installation**

1. If the station has been operating for some time and/or you have changed the default settings, make a note of the barometric pressure, total rainfall, and (if applicable) calibration numbers.

You must remove power from the station to install the WeatherLink, which will cause these values to be erased. ***Use the software to reenter these values after restoring power to the station.***

2. Remove the mounting base from the station and remove all power from the station by removing the AC-power adapter and battery backup.

Failure to remove power to the weather station before installing the WeatherLink may cause damage to the WeatherLink or station.

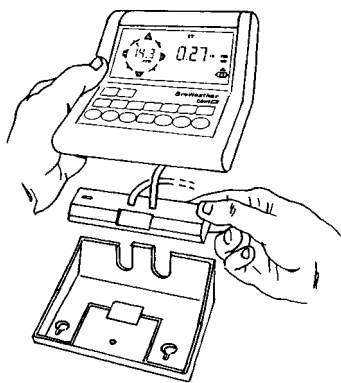
3. Insert the cable plug at the end of the short cable coming from the WeatherLink into the jack marked C3 (To LINK) on the bottom of the console.
4. Restore power to the weather station by reattaching the power adapter and battery backup.

The weather station should beep three times. The third beep, which should occur within 30 seconds, indicates that the WeatherLink is operating correctly.

5. To identify which link revision you have, look at the label on the back of the WeatherLink and write down the first two letters of the manufacturing code.

If the first two letters are "LD," you have revision D. If the first two letters are "LE," you have revision E. The Rev. E WeatherLink has been enhanced for use with radio connections.

6. Place the WeatherLink inside the mounting base and reattach the mounting base.



PLACE WEATHERLINK INSIDE BASE.

7. Insert the cable plug at the end of the long cable coming from the WeatherLink into the jack marked L1 (To LINK) on the isolator unit.
8. Insert the cable plug at one end of the 40-foot WeatherLink cable into the jack marked L2 (To PC) on the isolator unit. Use the cable plug on the end of the cable where the L2 side of the cable label is closest to the cable's end.

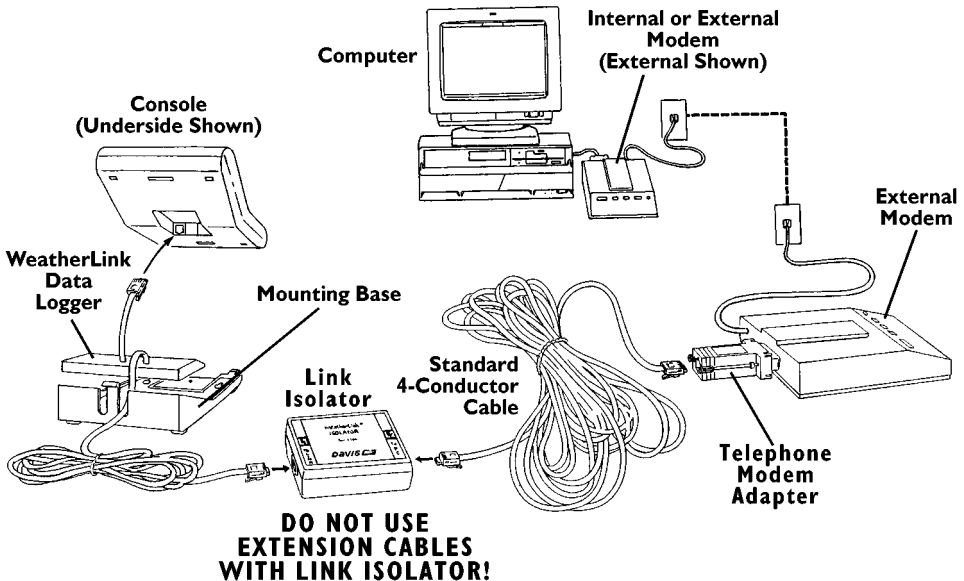
9. Insert the cable plug at the other end of the 40-foot WeatherLink cable into the jack marked PC on the PC COM port adapter. Use the cable plug on the end of the cable where the PC side of the cable label is closest to the cable's end.
This connection totals 48 feet (14.5 m) which is the maximum connection distance you may have without using Davis' SRM.
10. Attach the PC COM port adapter to a free serial port on the back of your computer.
Look for a "male" connector with 9 pins.

PHONE MODEM CONNECTION

The instructions below explain how to make a typical phone modem connection.

Typical Phone Modem Installation

The illustration below shows a typical phone modem connection. This involves connecting the WeatherLink to the weather station and to a modem at the station site and connecting your computer's modem to a phone line, which will allow you to "dial" the weather station.



TYPICAL PHONE MODEM INSTALLATION

• Phone Modem Installation Instructions

Before installing the WeatherLink for a phone modem connection, you need to install and configure a modem for use with your computer (according to the instructions supplied by the manufacturer). Make a note of the COM port and IRQ used by the modem. You will need this information when entering serial port settings for the station (see “Serial Port” on page 32).

1. If the station has been operating for some time and/or you have changed the default settings, make a note of the barometric pressure, total rainfall, and (if applicable) calibration numbers.

You must remove power from the station to install the WeatherLink, which will cause these values to be erased. ***Use the software to reenter these values after restoring power to the station.***

2. Remove the mounting base from the station and remove all power from the station by removing the AC-power adapter and battery backup.

Failure to remove power to the weather station before installing the WeatherLink may cause damage to the WeatherLink or station.

3. Insert the cable plug at the end of the short cable coming from the WeatherLink into the jack marked C3 (To LINK) on the bottom of the console.
4. Insert the cable plug at the end of the long cable coming from the WeatherLink into the jack marked L1 (To LINK) on the isolator unit.
5. Insert the cable plug at one end of the 40-foot WeatherLink cable into the jack marked L2 (To PC) on the isolator unit. Use the cable plug on the end of the cable where the L2 side of the cable label is closest to the cable's end.
6. Insert the cable plug at the other end of the 40-foot WeatherLink cable into the jack marked PC on the PHONE MODEM adapter. Use the cable plug on the end of the cable where the PC side of the cable label is closest to the cable's end.
7. Connect the PHONE MODEM adapter to the external modem.
8. Connect the external modem to an available phone jack.
9. Turn the modem on.

The modem must be on before you restore power to the weather station.

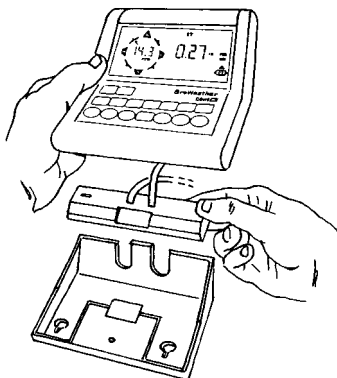
10. Restore power to the weather station by reattaching the power adapter and battery backup.

The weather station should beep three times. The third beep, which should occur within 30 seconds, indicates that the WeatherLink is operating correctly.

11. To identify which link revision you have, look at the label on the back of the WeatherLink and write down the first two letters of the manufacturing code.

If the first two letters are “LD,” you have revision D. If the first two letters are “LE,” you have revision E. The Rev. E WeatherLink has been enhanced for use with radio connections.

12. Place the WeatherLink inside the mounting base.



PLACE WEATHERLINK INSIDE BASE.

13. Reattach the mounting base to the weather station.

As you do so, guide all the cables through the slots on the mounting base.

A Few Notes About Phone Modem Connections

If you indicate a phone modem connection when setting up your station (see “Serial Port” on page 32), the software automatically dials the station (using the phone number you provided) whenever you attempt to initiate a program action which requires the software to “talk” to the WeatherLink.

Note: The software dials the station only after you choose Ok or Yes to initiate a program action. If you do not wish to connect, press Esc before you are actually connected.

While connected to a phone modem station, the software displays your on-line time in the main program window’s title bar. Once connected, the software will remain “on line” with the phone modem station until you choose to hang up. The software remains “on line” whether or not you are doing something which requires it to be connected.

Hanging Up

1. Choose Hang Up.

The software prompts you to confirm that you want to hang up.

2. Choose Yes.

The software hangs up the modem and closes the On Line window.

RADIO MULTI-POINT CONNECTION

If you have more than one station, follow the instructions included with the Installation Kit. If you have only one station, treat the system as a “Direct Connection” on page 5.

- **HARDWARE INSTALLATION**
- *Radio Multi-Point Connection*
-
-

This chapter covers software installation and setup.

INSTALLING THE SOFTWARE

1. Place the Install Disk in your disk drive.
2. Choose Run from the File menu, type A:SETUP (or B:SETUP) in the text box, and choose OK to begin the installation.
3. Follow the on-screen prompts to complete the installation.

RUNNING THE SOFTWARE

To run the software, double-click on the GroWeatherLink icon.

ADDING A STATION

In order to interact with your station, you must “add” a station, which entails naming the station, configuring the software to work with that station and with your computer hardware, and setting station values such as time, barometric pressure, total rainfall, and calibration numbers. For performance reasons, the software reads these values from the station configuration file saved on your hard disk rather than from the station itself. **Therefore, you must set station values from the software.** If you set station values from the station itself, the readings you see in the bulletin, database, and plots may not agree with your station’s readings.

About the Walkthrough

The software includes a station setup walkthrough which steps you through the entire station configuration procedure. After adding a new station, the software automatically prompts you to indicate whether or not you want to be walked through the configuration procedure. If you choose Yes, the software takes you through the following dialog boxes:

- ▲ Station Configuration
- ▲ Choose Units
- ▲ Serial Port Settings
- ▲ Set Degree-Day Thresholds
- ▲ Set Barometer
- ▲ Set Rain Cal
- ▲ Enter Total Rainfall
- ▲ Set Time and Date
- ▲ Set Archive Interval

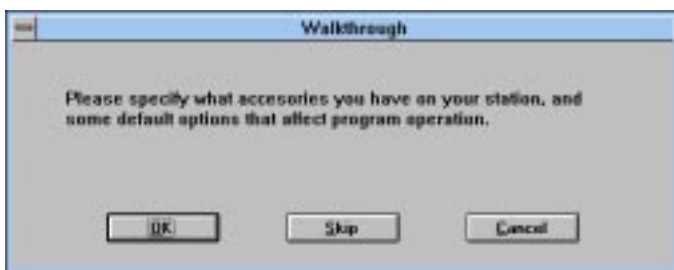
• SOFTWARE INSTALLATION

• Adding a Station

- ▲ Start Growing Period
- ▲ Set Auto Clear
- ▲ Set Station Alarms
- ▲ Set Auto Download Time(s)
- ▲ Set Leaf Wetness or Soil Temperature

You may, of course, choose No and set up the station by choosing all of the necessary commands from the menus. A Walkthrough command is included in the Setup menu which allows you to go through the walkthrough procedure at any time.

At each step in the walkthrough procedure, the software will provide confirmation boxes prompting you to indicate whether or not you wish to continue.



WALKTHROUGH CONFIRMATION BOX

To continue, choose OK. To skip this step and move to the next step, choose Skip. To cancel the entire walkthrough procedure, choose Cancel.

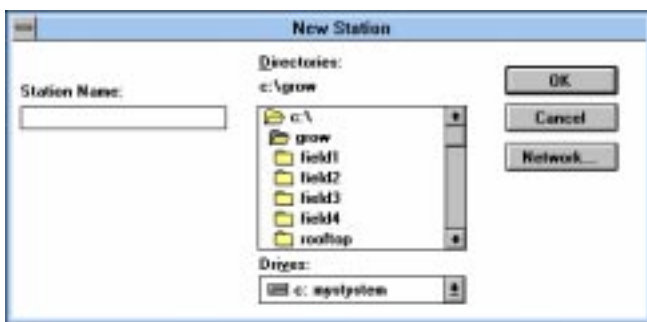
Adding a Station

Follow the procedure below to add a station. Note that where necessary in the procedure below, the software will automatically dial a phone modem station. See "A Few Notes About Phone Modem Connections" on page 9 for instructions on dialing and hanging up.

Note: Repeat this procedure for each station you want to add.

1. Choose New Station from the main menu.

The software opens the Add New Station dialog box.



ADD NEW STATION DIALOG BOX

2. Type the station name into the text box.

The station name may be up to 40 characters/spaces long. Note that the software uses the first eight characters of the station name (not counting spaces or punctuation marks) as the name of the directory into which it saves this station's database and configuration files. The first eight characters of each station name must, therefore, be unique. The software also uses the first three characters as the file extension for that station's database files (the first three characters need not be unique).

3. Choose OK.

The software saves the station name, creates a directory for that station using the first eight characters in the station name (not including punctuation and spaces), and prompts you to indicate whether you want to enter the walk-through procedure.



BEGIN WALKTHROUGH CONFIRMATION

4. To begin the walkthrough, choose Yes.

The software prompts you to confirm that you want to select your station and accessory options.

5. Choose OK.

The software opens the Station Configuration dialog box. In this dialog box, you may enter information about your station. For more detailed instructions on this dialog box, see "Station Config" on page 30.



STATION SETUP DIALOG BOX

6. When finished entering information, choose OK.

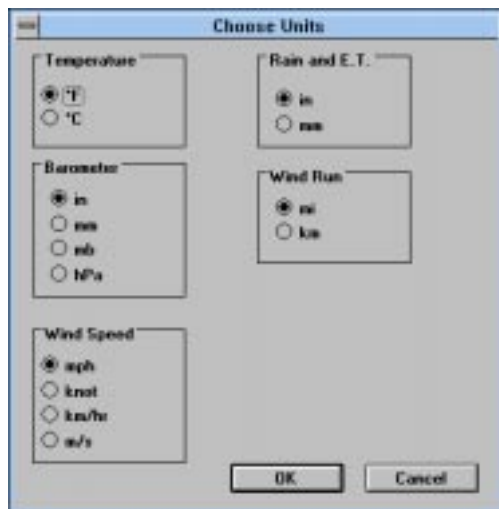
The software saves the information and prompts you to confirm that you want to select the units of measure in which information is displayed.

- **SOFTWARE INSTALLATION**

- *Adding a Station*

7. **Choose OK.**

The software opens the Choose Units dialog box. In this dialog box, you may set the units of measure in which you want the software to display, plot, and print information.



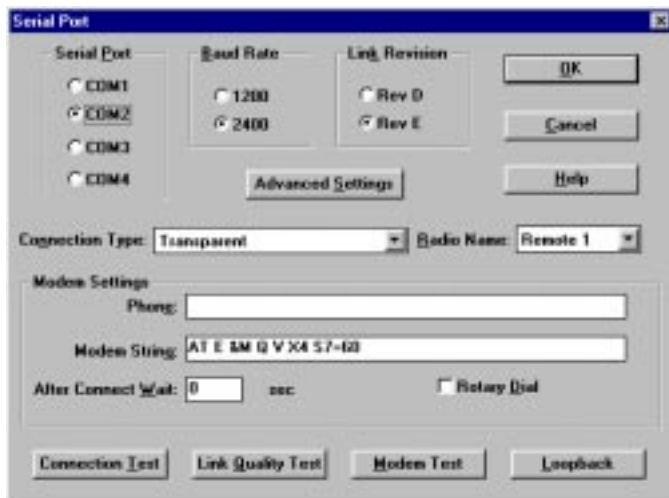
UNIT PREFERENCES DIALOG BOX

8. **When finished selecting units of measure, choose OK.**

The software saves the information and prompts you to confirm that you want to select your serial port options.

9. Choose OK.

The software opens the Serial Port Settings dialog box. In this dialog box, you may select all of your communications options, including serial port, IRQ line, modem baud rate, phone number, etc. For more detailed instructions on this dialog box, see “Serial Port” on page 32.



SERIAL PORT SETTINGS DIALOG BOX

▲ **Serial Port**

Select the serial port. If you do not know the serial port setting for your station, you may use the Loopback button in this dialog box to determine the correct settings. see “Finding the Correct Serial Port” on page 23 for instructions on using Loopback.

▲ **Link Revision**

Select the link revision. To determine which revision you have, check the manufacturing code on the back of the WeatherLink. The second letter (the first letter should be an “L”) is the revision letter of the WeatherLink.

▲ **Connection Type**

Choose the type of connection from the drop down list. For most connections, “Transparent” is the appropriate choice. Otherwise, if applicable, choose “Phone Modem” or the appropriate multi-point radio modem. (See “Serial Port” on page 32 for details.)

▲ **Radio Name**

If you are using a multi-point radio modem to connect to the WeatherLink, select the name of the radio from the drop down list. The name should match the name you used when configuring the radio.

▲ **Phone**

If you are using a telephone modem to connect to the WeatherLink, enter the modem’s phone number in this field.

▲ Modem String

The default modem string should work for almost all modems. Before changing the modem string, consult the README.TXT file for an explanation of what each part of the string means.

10. Test your connection to the weather station by choosing Connection Test.

The test will attempt to communicate with the station. If successful, you will be informed that you are connected to a GroWeather station. If unsuccessful, use Loopback to find the correct settings in a transparent connection(see “Finding the Correct Serial Port” on page 23), or use the Modem Test to test and confirm that a modem is attached at the specified COM port.

11. Once the serial port settings are correct, choose OK.

The software prompts you to confirm that you want to set the station’s degree-day thresholds.

12. Choose OK.

The software opens the Set Deg-Day Threshold dialog box. In this dialog box you may set the high and low degree-day thresholds on the station. This does not affect the degree-day totals calculated by the software (see “PC Degree Days” on page 58).



SET DEG-DAY THRESHOLDS

13. After setting degree-day thresholds, choose OK.

The software sets the degree-day thresholds and prompts you to indicate whether you want to set the barometer.

14. Choose OK.

The software opens the Set Barometer dialog box. In this dialog box, you may set the barometric pressure on your weather station to the correct barometric pressure. For more detailed instructions on this dialog box, see “Set Barometer” on page 38.



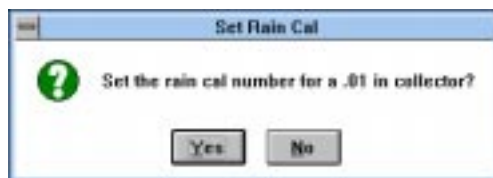
SET BAROMETER DIALOG BOX

15. After setting the barometric pressure, choose OK.

The software sets the barometer on the weather station and prompts you to indicate whether you want to set the rainfall calibration number (Rain Cal) on the weather station (to make sure the calibration number is correct for the type of rain collector you indicated in the station setup).

16. Choose OK.

The software opens the Set Rain Cal confirmation box. For more detailed instructions on this box, see “Set Rain Cal” on page 38.



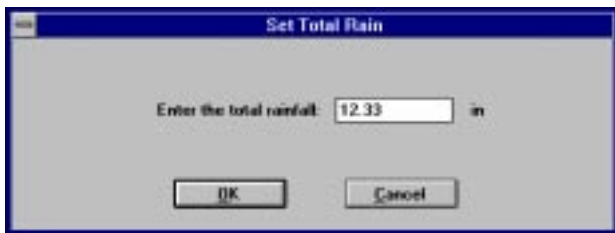
SET RAIN CAL CONFIRMATION BOX

17. Choose Yes.

The software sets the rainfall calibration number and prompts you to indicate whether you want to enter a total rainfall amount for the weather station (for example, to reenter the amount of total rainfall you had registered before you removed power from the weather station to install the Weatherlink).

18. Choose OK.

The software opens the Set Total Rain dialog box. In this dialog box, you may enter a total rainfall amount. For more detailed instructions on this dialog box, see “Set Total Rain” on page 40.



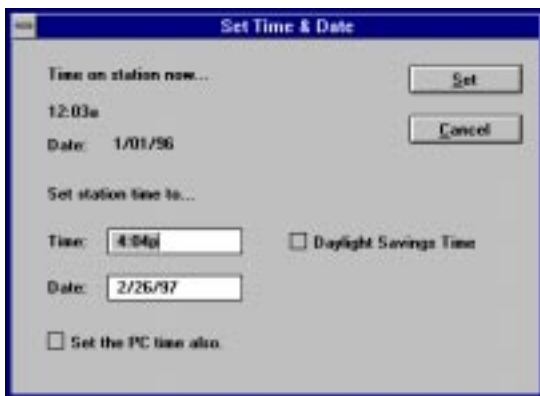
SET TOTAL RAIN DIALOG BOX

19. After entering the total rain, choose OK.

The software sets the total rain on the weather station and prompts you to indicate whether you want to set the time and date on your weather station.

20. Choose OK.

The software opens the Set Time and Date dialog box. In this dialog box, you may set the weather station's time and date. It is important that you do this so the weather station, Weatherlink, and computer are synchronized. For more detailed instructions on this dialog box, see “Set Time” on page 36.



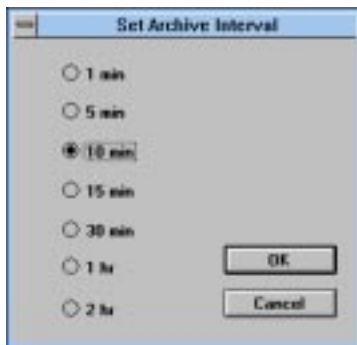
SET TIME AND DATE DIALOG BOX

21. After entering the time and date, choose OK.

The software saves the settings and prompts you to indicate whether you want to set the archive interval.

22. Choose OK.

The software opens the Set Archive Interval dialog box. In this dialog box, you may set the interval at which data is stored to the Weatherlink. For more detailed instructions on this dialog box, see “Set Archive Interval” on page 37.



SET ARCHIVE INTERVAL DIALOG BOX

23. When finished selecting an archive interval, choose OK.

The software informs you that this procedure will clear the archive memory.

24. Choose OK.

The software sets the archive interval and clears your archive memory. It then prompts you to indicate whether you want to start the growing period on the station.

25. Choose OK.

The software prompts you to confirm that you want to restart the period on your station. Consult your station's manual for information on the period.

26. Choose Yes.

The software clears all period totals and averages and begins a new period on the station. It then prompts you to indicate whether you want to set the Auto-Clear status on the station.

27. Choose OK.

The software opens the Set AutoClear dialog box. From this dialog box, you may select the which highs, lows, and daily totals should be cleared by the station's AutoClear feature as set the time at which they should be cleared each day. For more detailed instructions on this dialog box, see "Set Auto Clear" on page 42.



SET AUTOCLEAR DIALOG BOX

28. When finished selecting the functions you want cleared, choose OK.

The software sets the station's AutoClear feature and prompts you to indicate whether you want to set the station's alarms.

29. Choose OK.

The software opens the Set Station Alarms dialog box. From this dialog box you may set alarm points for any of your station's alarms. For more detailed instructions on this dialog box, see "Set Alarms" on page 43.



The image shows a software dialog box titled "Set Station Alarms". It contains various input fields for setting alarm thresholds for different weather parameters. The parameters and their current values are as follows:

Parameter	High	Low	Other
Air Temp.	100.0 °F	32.0 °F	
Soil Temp.			
Wind Speed	30.0 mph		
Wind Chill			
ET			Total
Rain			
Dew Point	<input checked="" type="checkbox"/> On		
Temp. Hum Index			
Outside Hum.			
Deg. Day			Total
Barometer	<input type="radio"/> Off	<input type="radio"/> .7 mb	<input checked="" type="radio"/> 1.4 mb <input type="radio"/> 2 mb
Time	3:42a		

On the right side of the dialog box, there are two checkboxes: "User Alarm 1" and "User Alarm 2", both of which are currently unchecked. At the bottom right, there are two buttons: "Set" and "Cancel".

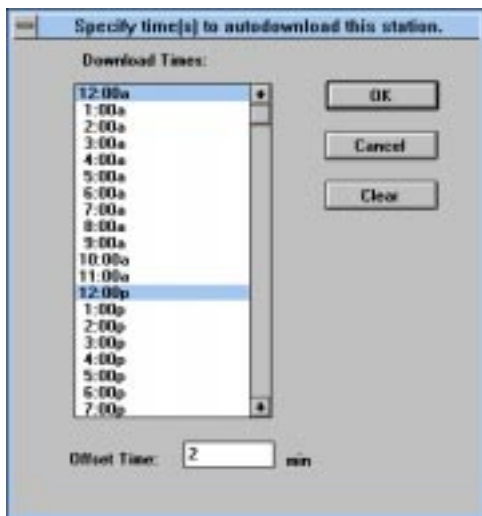
SET STATION ALARMS.

30. After entering alarm thresholds, choose OK.

The software sets the station's alarms and prompts you to indicate whether you want to set up the software automatic download feature.

31. Choose OK.

The software opens the Set AutoDownload Time(s) dialog box. From this dialog box, you may select the time (s) at which you want the software to automatically download data from the WeatherLink each day. For more detailed instructions on this dialog box, see “Auto Download” on page 34.



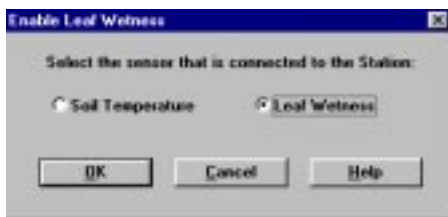
SET AUTODOWNLOAD TIME(S) DIALOG BOX

32. After selecting automatic download times, choose OK.

The software sets the autodownload times for this station, and prompts you to indicate if you want to log leaf wetness or soil temperature data.

33. Choose OK.

The software opens the Set Leaf Wetness dialog box. From this dialog box you may configure your software and console to log either leaf wetness or soil temperature data. For more detailed instructions on this dialog box, see “Leaf Wetness” on page 44.



34. After selecting a sensor, choose OK.

The software informs you that you have completed the walkthrough procedure, and prompts you to indicate whether you want to return to the beginning of the walkthrough.

35. To complete the walkthrough, choose No.

The software returns you to the main menu.

36. If necessary, hang up a phone modem connection (see “Hang Up” on page 28).

FINDING THE CORRECT SERIAL PORT

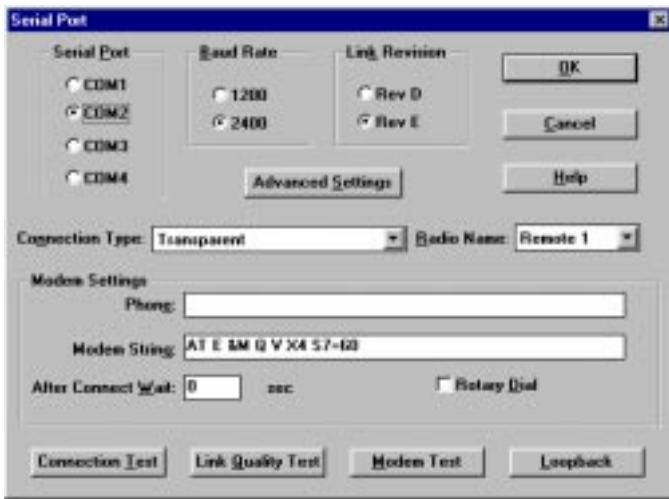
The software contains a procedure for locating the serial port to which your station is connected or determining whether that serial port is working.

Note: *This procedure will only work for direct connections. If you are making a phone modem connection, you may want to simply check the communications software you normally use for the correct serial port setting. Otherwise, you must consult the documentation supplied with your modem.*

In order to use this procedure, you will need the loopback connector (the short wire with a phone jack on one end and a red plastic tip on the other) supplied with your GroWeatherlink software package.

1. If necessary, disconnect the 40-foot WeatherLink cable from the PC COM port adapter.
2. Insert the loopback connector into the PC COM port adapter.
3. Choose Serial Port from the File menu.

The software opens the Serial Port Settings dialog box.



SERIAL PORT SETTINGS

4. Choose Loopback.

The software will search the currently selected serial port for the loopback connector.

5. Choose OK.

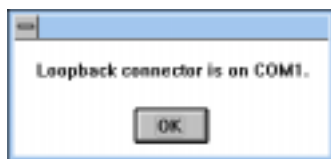
If the software located the loopback connector, it returns you to the Serial Port Settings dialog box. Otherwise, the software prompts you to indicate whether you want to check all other standard serial ports.



CHECK STANDARD SERIAL PORTS CONFIRMATION

6. Choose OK.

The software will search all standard serial ports for the loopback connector. When finished, the software will either inform you that it could not locate the loopback connector or it will inform you of the COM port at which it located the connector.



LOOPBACK CONNECTOR FOUND CONFIRMATION

7. Choose OK.

The software returns you to the Serial Port Settings dialog box. You will notice that the software selects the correct COM port.

8. Choose OK.

The software saves these settings.

4 USING THE SOFTWARE

- Everything you need to know about running the software (once it is correctly installed) is explained in this chapter.

THE WEATHER STATION

Depending on which optional sensors you have connected to your station, certain information and options within the software may not function or display data. The software may only display and plot data for which your weather station has a sensor. For example, if you do not have the external temperature/humidity sensor, you may not plot, view, or print humidity information. The area set aside for this information on the bulletin, summary screen, browser, etc. will simply be blank.

MULTIPLE STATIONS

The software can support the use of any number of weather stations with a single version of the program. Each station must connect to its own WeatherLink, however. If you have set up more than one station, whenever you load the software you will be asked to choose a station.



CHOOSE A STATION DIALOG BOX

All program actions affect the open station. The name of the open station appears at the top of many program windows. To open a different station, choose Open Station from the File menu (see “Open Station” on page 27).



FILE MENU

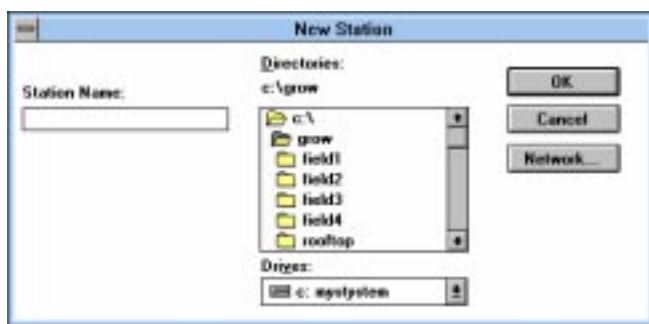
The file menu contains commands relating to station files and stations. Each command is explained separately below.

New Station

Each station connected to the computer must have its own “station” within the software. This tells the software into which database new information should be saved and provides the necessary communication settings (serial port, IRQ, etc.).

1. Choose New from the File menu.

The New Station dialog box appears.



ADDING A NEW STATION

2. To add a station, type the desired station name (up to 40 characters/spaces) into the Station name text box; choose OK.

The software saves the station, creates a directory for that station using the first eight characters in the station name (not including punctuation and spaces), and prompts you to indicate whether you want to enter the walk-through procedure (see “About the Walkthrough” on page 11).

Open Station

Only one station may be open at a time. That way the software knows into which database downloaded data should be saved, which communications settings to use, which database to use when plotting, etc.

1. Choose Open Station from the File menu.

The Open Station dialog box appears.



OPEN STATION

2. Choose a station from the list box on the left and choose OK to open that station.

Delete Station

You may delete a station from the software quickly and easily. Deleting a station removes the station directory and all files and subdirectories from your hard disk.

1. Choose Delete Station from the File menu.

The Delete Station dialog box appears.



DELETE STATION

2. Select a station from the list box on the left and choose OK.
You will be prompted to confirm that you want to delete the station.
3. Choose OK.
The software deletes the station and all related files.

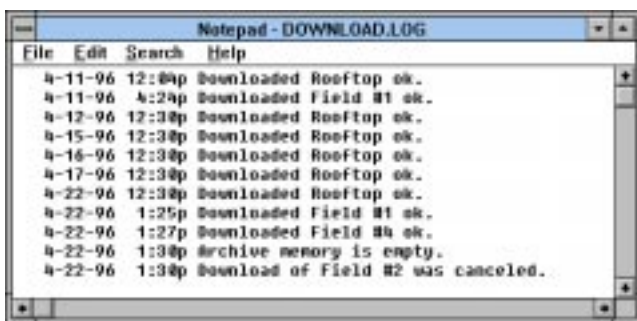
View Log

Information about the automatic download of your station(s) is automatically written to a file called “download.log” which is saved onto the hard disk in the directory “ahead” of the station’s directory. The log will show you whether the download was successful or not for each station and give you the time and date at which it started and completed.

Note: It is possible, after continued use, for the log file to become too large for Window’s Notepad to open. If this occurs, delete the entire file from your hard disk. The software will create a brand new file at the next automatic download.

1. Choose View Log from the File menu.

The automatic download log appears.



AUTOMATIC DOWNLOAD LOG

2. To close the log window, choose Exit from the File menu.

Hang Up

To hang up on a phone modem connection, choose Hang Up from the File menu.

Merge Data

To fill in missing weather data, you can supplement one weather station’s data with another. The database you want to supplement is called the *original* database; the database that provides the missing data is called the *source* database.

Before merging the databases, keep in mind the following tips and suggestions:

- ▲ **Make sure you have enough space on the disk containing the Windows Temp directory to hold a file with the combined size of the original and source databases.**

The operation creates a new data file in the Windows Temp directory that is erased once the merge operation is complete.

- ▲ **Best results are obtained if the original files and the source files have the same archive interval.**

If the archive intervals are different, try to merge the file with the longer archive interval into the one with the shorter interval. For example, if one database has 15-minute intervals and another has 30, open the station with the 15-minute interval and merge the 30-minute interval files into it. This way the shorter interval database will not add twice as many, possibly conflicting, data points.

- ▲ **To compare databases archived on separate computers, copy the station configuration file, as well as the source files, from the source database.**
See “Database Organization” on page 97 for details on the station configuration and source files.
- ▲ **The data merge does not change the time or data of merged data.**
This means that it can not solve the problem of weather stations that have been re-powered and thereby had their dates reset to January 1.
- ▲ **Differences in calibration numbers or settings are not taken into account.**
- ▲ **Data notes in the source file are not copied into the merged data file.**
- ▲ **After the merge, it is important to check the data (paying special attention to the barometer readings).**
Always examine merge results critically after performing a data merge. Use the “Edit a Record” feature (page 79) to fine tune the data as needed. If you are not satisfied with the results of the merge, you can restore the original, unmerged data file by deleting the merged data file and renaming the backup file to the original three-letter extension.
Note: Only one backup file is made. If you perform multiple merge operations on the same file, only the results of the last merge can be undone.

Follow the steps below to merge a source data files with original data files:

1. **Open the original database - the database with missing data.**
2. **Choose File Merge from the File menu.**
A Merge Data dialog box appears.
3. **Select the data file(s) that contain the data that you want to add to the original database.**

You can access data files in any directory on your system, but you can only add files from one directory at a time. The data files are found in the station directory and will have a name of the form "yyyy-mm.ext" where "yyyy" is the four digit year, "mm" is the two digit month, and "ext" is the station extension, usually the same as the first letters of the station directory. For example the file for March 1999 for a station named "My Weather" would be "1999-03.MYW". To select multiple files, hold down the Ctrl-key or the Shift-key while clicking.

Note: Directory names longer than 8 characters will appear with a modified name. For example, a directory named "My Weather Station" might appear as "Myweat~1."

The extensions of the source data files do not have to be the same as the extensions of the original files.

4. **Choose OK to merge the selected files (source data) into the original database.**
All data from the original database will be preserved in the merge, and any data points that are missing will be supplied by the source files. If the original database already has a file for a month that is being merged, the original file's extension will be renamed ".bak" so that the merged file can take on the extension of the original database.

Exit

To exit the software, choose Exit from the File menu.

• USING THE SOFTWARE

• Setup Menu

•



SETUP MENU

The commands in the Setup menu relate to station and software setup. Each of the commands is explained separately below.

Walkthrough

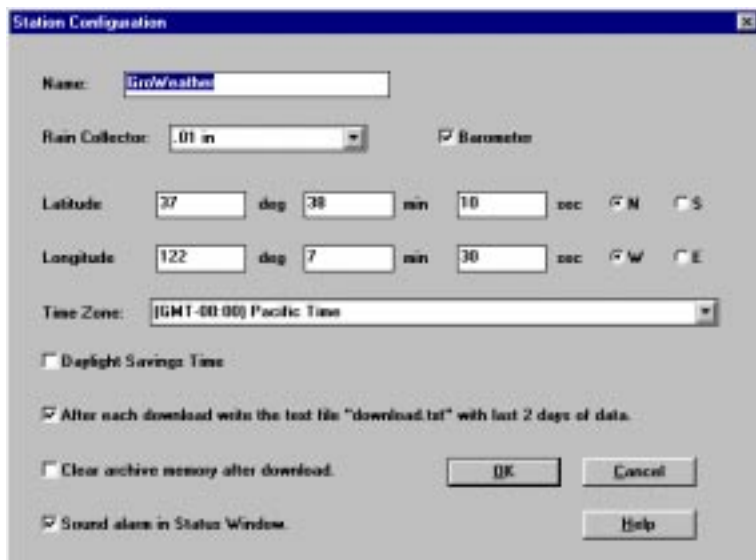
The station setup walkthrough automatically steps you through the entire station configuration procedure. It is explained in some detail in “About the Walkthrough” starting on page 11.

Station Config

You may enter a number of station-specific settings and information which help to identify each particular station.

1. Choose Station Config from the Setup menu.

The Station Configuration dialog box appears.



STATION CONFIGURATION

2. Enter the following information:

▲ Name

To change the station's name, type a new name into this text box. The software automatically changes the name of all station files and directories.

▲ Rain Collector

Select the increment in which the rain collector you use with the station measures rainfall. If you do not have a rain collector, choose None.

▲ **Barometer**

The station's built-in barometer is only really accurate between 50°F and 90°F (10°C to 32°C). The software will display the barometer graph on the bulletin or the summary. Installations in which the console is located outside may encounter inaccurate barometer readings when outside of this temperature range. If you experience this problem and if the inaccurate readings bother you, turn this option off.

▲ **Latitude and Longitude**

Enter your latitude and longitude. The software uses latitude and longitude when determining net radiation which is used in the calculation of Evapotranspiration.

Note: If you do not enter latitude and/or longitude, the software will use the ET calculated by the console, which is not as precise as the software.

▲ **Time Zone**

Select the time zone in which the station is located from the drop-down list box. The software uses the station's time zone when determining net radiation which is used in the calculation of Evapotranspiration.

▲ **Daylight Savings Time**

If you are currently on Daylight Savings Time, select this option. The software uses Daylight Savings Time information when determining net radiation which is used in the calculation of Evapotranspiration.

▲ **After download create text file of last 2 days**

The software is capable of automatically creating a text file ("download.txt") which contains all downloaded records for the last 2 days (the day on which you downloaded and the previous day) after each download.

▲ **Clear archive memory after download**

Data is stored in the WeatherLink's archive memory (see "Archive Memory" on page 95) until you clear it. You may decide to have the software automatically clear the archive memory whenever it downloads data by selecting this option. Clearing after each download will decrease the time it takes to download because there will be less "accumulated" data in the archive memory. Not clearing after each download allows you to store data into multiple databases (if more than one person uses a single weather station, for example) by downloading the archive memory more than once.

▲ **Sound alarm in Status Window**

To have the computer sound its own alarm (by beeping) in the Station Status window (see "Station Status" on page 47) when an alarm is triggered, select this option.

3. **When finished, choose OK.**

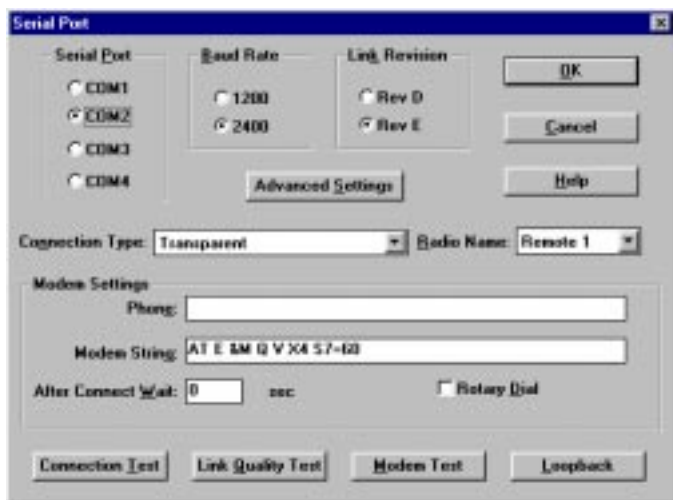
The software save the station configuration settings.

Serial Port

In order to communicate with the WeatherLink and station, you need to specify communications settings for the station.

1. Choose Serial Port from the Setup menu.

The Serial Port Settings dialog box appears.



SERIAL PORT SETTINGS

2. Enter the following information:

▲ Serial Port

Select the serial port to which the WeatherLink (or modem) is connected.

▲ Baud Rate

Unless you are using a modem which only operates at 1200 baud, leave the baud rate setting at 2400.

Note: If you are using a 1200 baud modem, use a ball point pen or paper clip to flip the dip switch on the back of the WeatherLink data logger.

▲ Connection Type

Choose the type of connection from the drop down list:

- ▲ Transparent: Direct (local) connections, Short-Range Modem connections, or point-to-point (one base station, one field station) radio connections. Used when no dialing or addressing is needed.
- ▲ Telephone Modem: Telephone modem or cellular telephone modem connections. For any device using standard AT commands.
- ▲ YDI Model 910 Multi-Point: For multi-point (single base station, multiple field stations) connections through YDI radios.
- ▲ RF Neulink 9600 Multi-Point: For multi-point (single base station, multiple field stations) connections through RF Neulink radios.

▲ **Radio Name**

If you are using a YDI or RF Neulink radio, select the remote radio's name from the drop down list (this should match the name you used when configuring the radio).

Note: If you have manually configured the remote radio to a custom name, select the Radio Name: "Other" and type the name (or ID number) into the Phone text box.

▲ **Rotary Dial**

Select this check box if your phone is rotary dial (as opposed to touch tone).

▲ **Phone**

Enter the phone number for the modem connected to the station in the text box. Make sure to enter the area code and any necessary prefixes (for example, 1, 011, etc.). You may enter the following special characters.

▲ Enter a comma (",") to cause the modem to pause before dialing the next digit. You may enter more than one comma to increase the length of time for which the modem pauses.

▲ Enter a "w" to cause the modem to wait for a dial tone before dialing the next digit.

▲ **Modem String**

Enter the desired modem initialization string in the text box. The default modem initialization string should work in almost all cases. Before changing the modem string, consult the online help file or the readme.txt file for an explanation of what each part of the string means.

3. **When finished selecting options, choose Connection Test.**

The software will check the connection to the station (or modem) using the current settings and indicate whether or not it was successful. If you cannot connect to the weather station, you may use Loopback (see "Finding the Correct Serial Port" on page 23) to determine the correct serial port, or the Modem Test to check and confirm that a modem is attached at the specified COM port.

Note: From the Serial Port Settings window, you can also run a "Link Quality Test." This test will check the general quality of the connection (it is most useful in wireless connections). The computer will continually request data packets and report the number of valid packets received and the number of errors which occurred for the listed time periods.

4. **Once the serial port settings are correct, choose OK.**

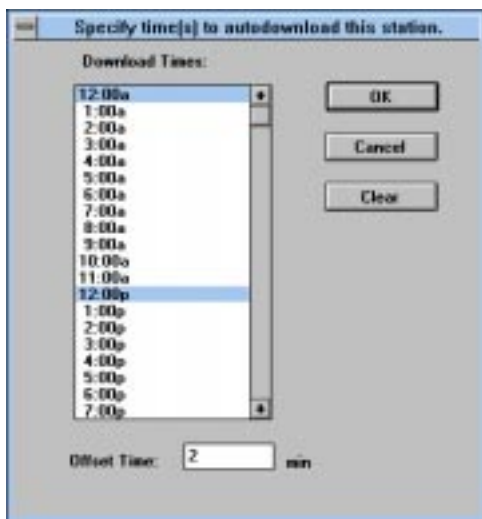
The software saves the communications settings.

• Auto Download

You may select the time(s) at which the station automatically downloads data each day. For more information on the automatic download feature see “Automatic Download” on page 96.

1. Choose Auto Download from the Setup menu.

The Set Auto Download Time(s) dialog box appears.



SET AUTO DOWNLOAD TIME(S)

2. Enter the following information:

▲ Download Times

Select the hours at which the software should automatically download information from this station by clicking on the desired hour in the list. You may select as many download times as you want; the software will download data from your station at each of the specified times. To clear all of the selections, choose Clear.

▲ Offset Time

If you want the software to download this station a specific number of minutes after the selected hour(s), enter the number of minutes here. For example, In the illustration above, the software would automatically download at 12:02 am and 12:02 pm. The offset time is especially useful is you have multiple stations and want to stagger download times during a single hour.

Note: We recommend offsetting the download by at least a few minutes to avoid conflicts. The WeatherLink cannot create a new record while a download is in progress. If a record on the hour is delayed and the offset time is "0", ET will be calculated incorrectly.

3. After setting the download time(s), choose OK.

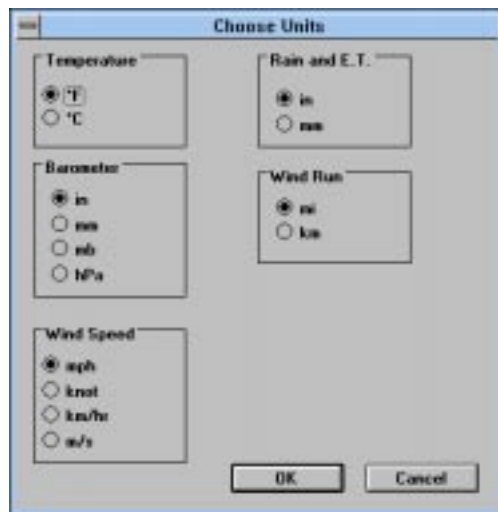
The software saves the automatic download time settings.

Select Units

You may select the units of measure in which data is displayed within the software. All data displays (bulletin, summary, plots, database, etc.) display data in the selected units of measure. Choosing units of measure in the software does not affect the units of measure in which data is displayed on the console.

1. Choose Select Units from the Setup menu.

The Choose Units dialog box appears.



CHOOSE UNITS

2. Select the desired units of measure for each condition:

▲ **Temperature: Fahrenheit (°F) or Celsius (°C)**

Wind chill, dew point, degree-days, and temperature-humidity index are all displayed in the same unit of measure as temperature.

▲ **Barometer: Inches of Hg (in), Millimeters of Hg (mm), Millibars (mb), or Hectopascals (hPa)**

▲ **Wind Speed: Miles per Hour (mph), Knots (knot), Kilometers per Hour (km/hr), or Meters per Second (m/s)**

▲ **Rain and ET: Inches (in) or Millimeters (mm)**

▲ **Wind Run: Miles (mi) or Kilometers (km)**

3. After selecting units of measure, choose OK.

The software saves your choices. All information will be displayed in the units of measure you selected.

• USING THE SOFTWARE

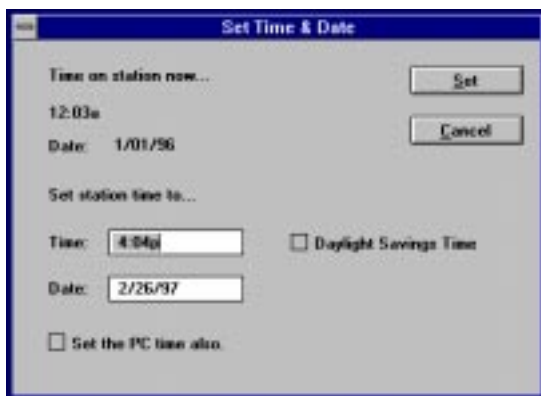
• Setup Menu

• Set Time

You may set the time and date on your weather station and computer from the software. It is important to make sure that both the station and computer have the same time and date.

1. Choose Set Time from the Setup menu.

The Set Time dialog box appears. The station's time and date appear at the top of the dialog box. The software automatically enters the computer's time and date into the text boxes at the bottom of the dialog box.



SET TIME

2. Enter the following information:

▲ Time

Enter the current time.

▲ Daylight Savings Time

In order to calculate ET, the software makes some assumptions about the position of the sun based the time and date. If you change the time for Daylight Savings Time, make sure you select the Daylight Savings Time option. Selecting (or deselecting) this option changes the setting in station configuration (see "Station Config" on page 30).

▲ Date

Enter the current date.

▲ Set the PC time also

If you want the software to change both the station's and the computer's time and date, select this option.

3. After entering time and date, choose OK.

The software prompts you to indicate whether you want to clear your archive as well.

4. Choose Yes or No.

The software sets the time and date on the station and the computer.

Set Archive Interval

You may choose to store data to the WeatherLink data logger every 1, 5, 10, 15, 30, 60, or 120 minutes. This interval is known as the archive interval. For information on archive memory and the effect that the archive interval has on the amount of data which may be stored in the WeatherLink, see “Archive Memory” on page 95.

Note: *Be aware that setting the archive interval clears your archive memory. You should download data before changing archive interval (see “Download” on page 48).*

1. Choose Set Archive Interval from the Setup menu.

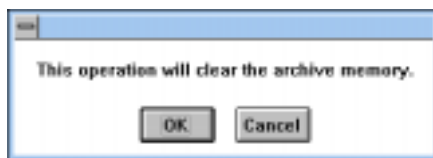
The Set Archive Interval dialog box appears. The radio button selected when the dialog opens (in this case, “10 min,”) indicates the WeatherLink’s current archive interval setting.



SET ARCHIVE INTERVAL

2. Select the desired archive interval and choose OK.

The software warns you that it is about to clear the archive memory.



CLEAR ARCHIVE WARNING

3. Choose OK.

The software sets the archive interval and clears the archive memory.

• USING THE SOFTWARE

• Setup Menu

• Set Barometer

You need to set the station's barometer using the software. For performance reasons, the software saves the necessary calibration number for the barometer in the station's configuration file, rather than reading it from the station itself. Therefore, in order for the software to display the correct barometric pressure, *you must set the station's barometer from the software.*

1. Choose Set Barometer from the Setup menu.

The software opens the Set Barometer dialog box.



SET BAROMETER

2. Enter the correct barometric pressure and choose OK.

The software saves the change in barometric pressure to both the station and the station's configuration file.

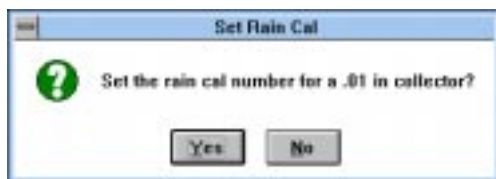
Set Rain Cal

You may set the rainfall calibration number on your weather station using the software to make sure your weather station has the correct rainfall calibration number for the type of rain collector you use. Based on the type of rain collector you selected in station configuration (see "Station Config" on page 30), the software automatically changes your station's rainfall calibration number to the correct setting.

Note: Consult your station manual for a more detailed description of the rainfall calibration number.

1. Choose Set Rain Cal from the Setup menu.

The software prompts you to confirm that you wish to change the rainfall calibration number.



SET RAINFALL CALIBRATION CONFIRMATION

2. Choose Yes.

The software sets the rainfall calibration number on your station.

Set Temp Cal

You need to set the station's temperature calibration numbers using the software. For performance reasons, the software saves the necessary calibration numbers for temperature in the station's configuration file, rather than reading it from the station itself. Therefore, in order for the software to display the correct temperature readings, *you must set the station's temperature calibration numbers from the software.*

Note: Consult your station manual for a more detailed description of temperature calibration numbers.

1. Choose Set Temp Cal from the Setup menu.

The Set Temperature Cal dialog box appears. The raw reading shown in this dialog box indicates the unadjusted reading coming from the sensor. The adjusted reading indicates what the software displays, adjusted for any previously entered calibration number.

	Raw Reading	Adjusted Reading
Soil Temp.	74.8	74.8
Outside Temp.	73.8	73.8

OK Cancel

SET TEMPERATURE CAL

2. Enter the desired adjusted reading and choose OK.

The software automatically calculates the necessary calibration number to convert the raw reading into the adjusted reading and saves that calibration number to the station and the station's configuration file.

Set Hum Cal

You need to set the station's humidity calibration number using the software. For performance reasons, the software saves the necessary calibration numbers for humidity in the station's configuration file, rather than reading it from the station itself. Therefore, in order for the software to display the correct humidity reading, *you must set the station's humidity calibration number from the software.*

Note: Consult your station manual for a more detailed description of humidity calibration number.

• USING THE SOFTWARE

• Setup Menu

1. Choose Set Hum Cal from the Setup menu.

The Set Humidity Cal dialog box appears. The raw reading shown in this dialog box indicates the unadjusted reading coming from the sensor. The adjusted reading indicates what the software displays, adjusted for any previously entered calibration number.



SET HUMIDITY CAL

2. Enter the desired adjusted reading and choose OK.

The software automatically calculates the necessary calibration number to convert the raw reading into the adjusted reading and saves that calibration number to the station and the station's configuration file.

Set Total Rain

You may want to enter a total rainfall amount to reflect any rainfall which occurred before you obtained your station or before you started using the software. In order for the software's rainfall totals to remain consistent with the station's totals, *you must enter total rainfall from the software.*

1. Choose Set Total Rain from the Setup menu.

The Set Total rain dialog box appears.



SET TOTAL RAIN

2. Enter the total rainfall amount and choose OK.

The software saves the total rainfall amount.

Set Deg Day Threshold

You may set your degree-day thresholds from the software. Note that the station's degree-day thresholds and totals are completely separate from the degree-days tracked by the software (see "PC Degree Days" on page 58).

1. Choose Set Deg Day Threshold from the Setup menu.

The Set Deg Day Threshold dialog box appears.



SET DEG DAY THRESHOLD

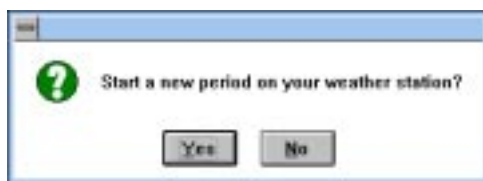
2. Enter the desired low and high threshold for degree-days and choose OK.
The software saves the thresholds.

Reset Period

You may restart the period on the weather station using the software. When the station restarts the period it clears all period totals and averages and begins accumulation new totals and averages. For more information on the period, consult your GroWeather manual.

1. Choose Reset Period from the Setup menu.

The software prompts you to confirm that you want to restart the period.



RESET PERIOD CONFIRMATION

2. Choose Yes.

The station clears all period total and averages and start a new period.

- USING THE SOFTWARE

- Setup Menu

- Set Auto Clear

You may quickly set up the station's AutoClear feature using the software (see the GroWeather manual for more details on the station's AutoClear feature).

1. Choose Set Auto Clear from the Setup menu.

The Set Auto Clear dialog box appears.



SET AUTO CLEAR

2. To turn AutoClear on for a function (or group of functions), select the appropriate check box.
3. Enter the time at which you want the station to clear the selected highs and lows each day into the text box.
4. When finished setting up AutoClear, choose OK.

The software automatically configures the station's AutoClear function to match the settings in this dialog box.

Set Alarms

You may quickly set the thresholds for the station's alarms using the software. The software also includes two "user alarms" which may be turned on and off from the software. These two alarms are for use with the Alarm Output Module and may be used to manually start or stop an external device.

1. Choose Set Alarms from the Setup menu.

The Set Alarms dialog box appears.

SET ALARMS

2. Enter the following information:

▲ High/Low Alarm

For all of the standard high/low alarms, enter the desired alarm threshold into the text box. To clear an alarm, delete the contents of the text box.

▲ Dew Point

Turn on the dew point alarm by selecting the check box. Clear the alarm by "de-selecting" the check box.

▲ Barometer

Select the desired change per hour which will trigger the barometer alarm. To clear the alarm, select Off.

▲ Time

Enter the time at which the alarm should be triggered into the text box.

▲ User Alarms (1 & 2)

These alarms allow you to trigger a device connected to the Alarm Output Module manually. To turn on either alarm, select the desired check box. Keep in mind that you will need to manually shut off this alarm.

- USING THE SOFTWARE

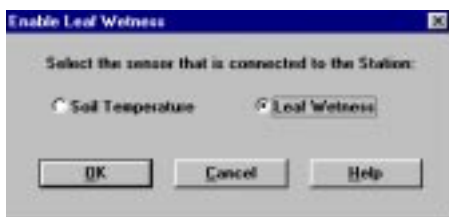
- Setup Menu

3. When finished entering alarm information, choose Set.

The software sets the stations alarms to match the settings in this dialog box.

Leaf Wetness

The radio buttons on this dialog box indicate whether the software and station are currently configured for leaf wetness or soil temperature. If, for example, you select Leaf Wetness from the Setup menu and find that the button next to Leaf Wetness is already highlighted (as shown below), then you know that your console is configured to expect leaf wetness readings.



To reconfigure both the software and the console, simply select the appropriate sensor, or leave as is, and click OK.

Note: Before changing from the soil temperature sensor to the leaf wetness sensor (or vice versa), download data and clear your archive memory.

By default, the software and console will assume the Soil Temperature sensor, rather than the Leaf Wetness sensor, is installed.

Note: If, at any point, your data indicate numbers appropriate to soil temperature when you intend to be logging leaf wetness, or vice versa, then your software and console are probably out of sync. If this happens, simply select the appropriate sensor in the above dialog box and click OK to configure both the software and the console at once.

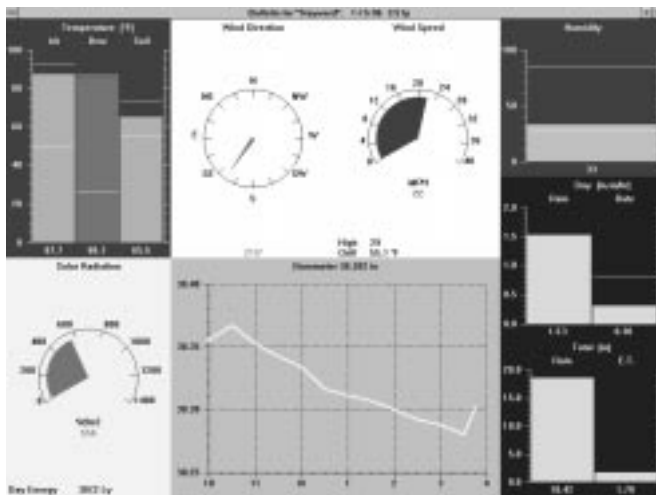


DISPLAY MENU

The commands in the Display menu allow you to view station information on your computer. Each of the commands is explained separately below.

Bulletin

The bulletin shows selected current conditions in “real time” on your computer.



BULLETIN

The bulletin gives you a graphic representation of the current reading and the numeric reading for each condition. For all bar graphs (air temperature, for example), highs and lows are represented by yellow lines which appear above the bar (high) or within the bar (low). As long as the bulletin is running, the software automatically updates highs and lows as they occur.

When you first start the bulletin, the software prompts you to indicate whether you want to download highs and lows from the station. Downloading highs and lows causes the software to “get” all of the highs and lows from the weather station and display them on the weather bulletin. If you download highs and lows it takes a bit longer to open the bulletin. If you do not download highs and lows, the highs and lows on the bulletin screen will only reflect the highs and lows recorded while the bulletin is running.

The bulletin displays a line graph of barometric pressure over the past six hours (unless you have turned off the barometer in “Station Config” on page 30). When you first open the bulletin, the software graphs the current barometric pressure and any barometric pressure data which exists in your database for the past six hours. (For example, if no barometric pressure data for the past six hours exists in the database, the software will only plot a single point which represents the current barometric pressure. If data exists for only a portion of the six hours, the software plots whatever data it has available in the database.) While the bulletin is running, the software plots another point on this graph every 15 minutes.

• USING THE SOFTWARE

• Display Menu

- ▲ **To start the bulletin, choose Bulletin from the Display menu.**

The software prompts you to indicate whether you want to download highs and lows. Choose Yes or No to continue.



DOWNLOAD HIGHS AND LOWS CONFIRMATION

- ▲ **To close the bulletin, double-click on the Control-menu box in the upper left corner of the window.**
- ▲ **To print the bulletin, choose Print from the Control menu or press Ctrl-P.**
Set your printer options in the Print dialog box (for best results, be sure to choose landscape mode) and then choose OK.

Summary

The summary shows a text table of *all* current conditions. Also included on the high/low summary screen are the highs and lows for each function along with the time and date they occurred. The information on the high/low summary is updated in the same way as the bulletin.

- ▲ **To start the summary, choose Summary from the Display menu.**

The software prompts you to indicate whether you want to download highs and lows. Choose Yes or No to continue.



DOWNLOAD HIGHS AND LOWS CONFIRMATION

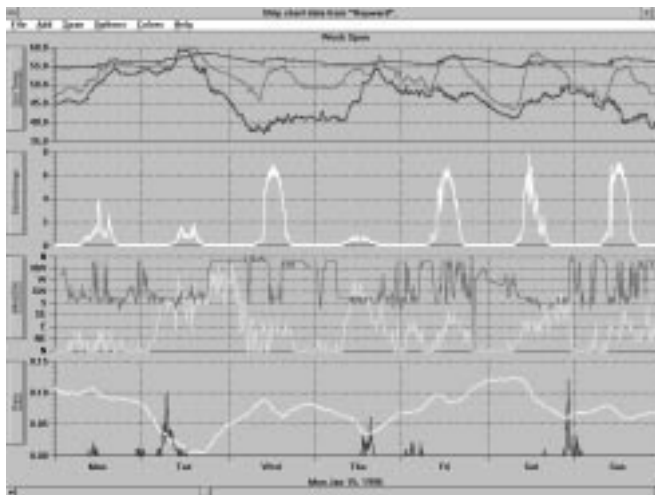
- ▲ **To close the summary, double-click on the Control-menu box in the upper left corner of the window.**
- ▲ **To print the summary, choose Print from the Control menu or press Ctrl-P.**

Strip Charts

The strip charts offer you 4 line graphs which update in real-time as long as they are open. You may select the data you want to plot on the strip charts and the span over which you want it plotted.

▲ To use the strip charts, choose **Strip Charts** from the **Display** menu.

If necessary, the software automatically downloads data from the open station in order to fill out the entire strip chart. After downloading, the Strip Chart window appears. For complete instructions on using the Strip Charts, see “Using the Strip Charts” on page 67.



STRIP CHART

Station Status

The software includes a station status display which allows you to monitor the status of your station's alarms and power connections.

1. Choose **Station Status** from the **Display** menu.

The Station Status window appears.

Parameter	Status
Power	Low
Backup	Low
Rain	OK
Daily E.T.	OK
Total E.T.	OK
Open Valve	OK
Humidity	OK
Total Elongated Chaps	OK
Low Air Temp.	OK
High Air Temp.	OK
Low Soil Temp.	OK
High Soil Temp.	OK
Open Moisture I	OK
Open Moisture II	OK
Pump Flow Indicator	OK
Wind Chill	OK

STATION STATUS

2. To close the station status window, double-click on the Control-menu box in the upper left corner of the window.



DATABASE MENU

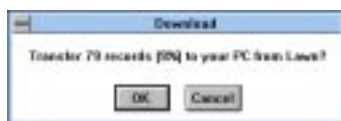
The Database menu contains commands related to the weather database created by the software. Each of the commands is explained separately below.

Download

Downloading allows you to transfer weather data from the WeatherLink's archive memory to the database stored on your computer's hard disk. The database consists of a number of individual database files each of which contains all of the data from a single month. For information on the difference between the data in your archive memory and the data in your database, see "Archive Memory vs. Database" on page 95.

1. Choose Download from the Database menu.

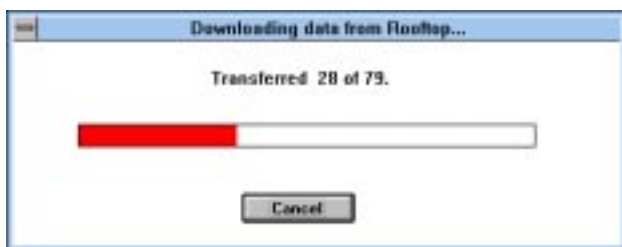
The software will show you how many records are currently saved in the archive memory and how much of the archive memory is currently filled.



NUMBER OF RECORD FOR DOWNLOAD

2. Choose OK.

The software will begin to download data. The software shows you the progress of the download in the form of a status bar and a text display of the number of records transferred so far and the total number of records to be transferred.



DOWNLOAD STATUS

After all records have been transferred, the software saves all records into the open station's database. If you chose to clear the archive memory after download (see "Clear archive memory after download" on page 31), the software clears the archive memory.

Browse

The Browse window allows you to view the raw data collected by your station. In addition to viewing the data on your computer, you may print the data, export it for use in database or spreadsheet programs, or add notes to individual records.

- ▲ **To browse the database, choose Browse from the Database menu.**

The Browse window appears. For complete instructions on using the Browse window, see “Using the Browse Window” on page 78.



The screenshot shows a window titled "Database: Station Data: 'Weather'". It displays a table with multiple columns representing various weather parameters over time. The columns include Date, Time, and numerous sensor readings such as Air Temp, Humidity, Wind Speed, etc. The data is organized in a grid format with alternating row colors for readability.

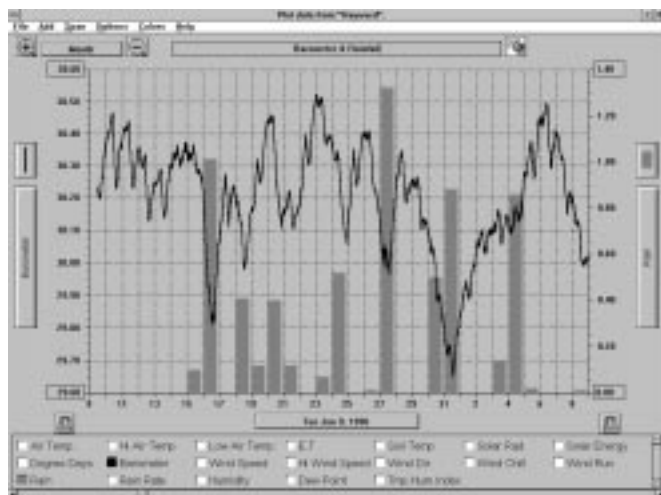
BROWSE WINDOW

Plot

The GroWeatherLink software includes a plotting engine which allows you to plot as many conditions as you want on a single plot. You can also save plots save plot templates for later viewing.

- ▲ **To plot data, choose Plot from the Database menu.**

The Plot window appears. For complete instructions on using the Plot window, see “Using the Plot Window” on page 73.



PLOT WINDOW



CROP MENU

The Crop menu contains commands which allow you to manage a list of crops to assist you in irrigation scheduling. Each of the commands is explained separately below.

New Crop

You may manage crop irrigation for as many crops as you want. For each crop you may enter crop and date-specific K factors (so the software can calculate ETc) and irrigation amounts.

1. Choose New Crop from the Crop menu.

The Crop Water Management dialog box appears.

CROP WATER MANAGEMENT

2. Enter the following information:

▲ Crop Name

Enter the name of the crop and any other identifying text into the text box.

Note: The software uses the first 8 characters of the Crop Name (not including punctuation and spaces) as the file name under which it stores crop water management information. The first 8 characters of each crop name must be unique.

▲ Plant Date

Enter the date on which this crop was planted into the text box.

▲ Start Date

Enter the starting date for ETc and irrigation calculation into the text box.

▲ End Date

Enter the ending date for ETc and irrigation calculation into the text box.

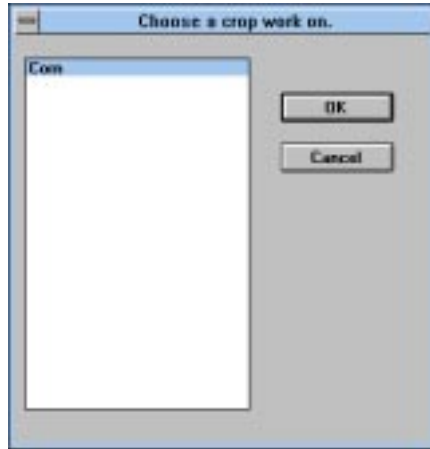
3. After entering this information, you may save the crop by choosing Done.
For more information about the crop water management feature, including instructions on using the rest of the features of this dialog box, see “Crop Water Management” on page 85.

Open Crop

Once you have added a crop record, you may open that crop record at a later date to add K Factors, irrigation amounts, or to view crop irrigation information.

1. Choose Open Crop from the Crop menu.

The Choose Crop dialog box appears.



CHOOSE CROP

2. Select the desired crop from the list and then choose OK.
The software opens the Crop Water Management dialog box for the selected crop record. see “Crop Water Management” on page 85 for information on using the crop water management feature.

• **Delete Crop**

You may delete a crop record from the list.

1. **Choose Delete Crop from the Crop menu.**

The Delete Crop dialog box appears.



DELETE CROP

2. **Select the crop record you want to delete from the list and then choose OK.**

The software prompts you to confirm that you want to delete the selected crop record.



DELETE CROP CONFIRMATION

3. **Choose OK.**

The software deletes the selected crop record.



REPORTS MENU

The Reports menu contains commands which allow you to view a group of software-generated reports. Each of the commands is explained separately below

Temp/Hum Hours

You may track the number of hours temperature is above or below a certain threshold *and* humidity is above a certain threshold.

1. Choose Temp/Hum Hours from the Reports menu.

The Temp/Hum Hours dialog box appears.

Name	Start Date	Temp. °F Threshold		Humidity Threshold	Development Total
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/> Above <input checked="" type="radio"/> Below	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/> Above <input checked="" type="radio"/> Below	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/> Above <input checked="" type="radio"/> Below	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/> Above <input checked="" type="radio"/> Below	<input type="text"/>	<input type="text"/>

TEMP/HUM HOURS DIALOG BOX

2. For each temp/hum hour total you wish to track, enter the following:

▲ **Name**

Enter the name of the crop or pest for which you want temp/hum hours calculated into the text box.

▲ **Start Date**

Enter the starting date from which you want temp/hum hours calculated into the text box.

▲ **Temp Threshold**

Enter the temperature threshold for this crop or pest into the text box.

▲ **Above/Below**

Select whether the software should calculate temp/hum hours based on the number of hours above or below the temperature threshold.

▲ **Humidity Threshold**

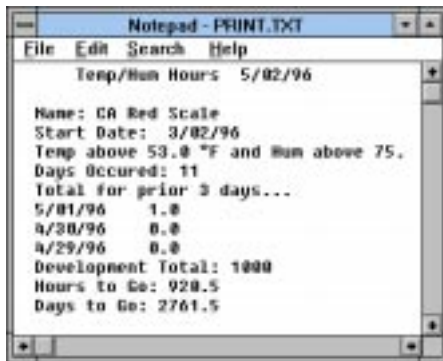
Enter the humidity threshold for this crop or pest into the text box.

▲ **Development Total**

Enter the number of temp/hum hours required for this crop/pest to develop.

3. After entering all necessary information, choose OK to view the temp/hum hours report.

The software calculates and displays temp/hum hours information. The report is opened into Windows' Notepad from which you may copy or print the report information.



TEMP/HUM HOURS REPORT

▲ **Name, Start Date, Thresholds**

The report shows the start and end dates and the threshold you entered.

▲ **Days Occurred**

The report shows the number of days on which temp/hum hours occurred.

▲ **Total for prior 3 days**

The report shows the number of temp/hum hours which occurred on each of the past 3 days.

▲ **Development Total**

The reports shows the development total you entered.

▲ **Hours to Go**

The report shows the total temp/hum hours left before the development total is reached.

▲ **Days to Go**

The report shows the expected number of days before the development total is reached. This calculation is based on the average number of temp/hum hours during the last three days.

Soil Temp. Hours

You may track the number of hours soil temperature is above a certain threshold.

1. Choose **Soil Temp Hours** from the **Reports** menu.

The Soil Temp Hours dialog box appears.

SOIL TEMP HOURS

2. Enter the following information:

▲ **Start Date**

Enter the starting date for which you want soil temperature hours calculated into the text box.

▲ **End Date**

Enter the ending date for which you want soil temperature hours calculated into the text box.

▲ **Temp Threshold**

Enter the soil temperature threshold above which you want soil temperature hours calculated into the text box.

3. After entering all necessary information, choose **OK** to view the soil temperature hours report.

The software calculates and displays soil temperature hours information. The report is opened into Windows' Notepad from which you may copy or print the report information.

Date	Hours
5/02/96	0.0
5/01/96	0.0
4/30/96	15.5
4/29/96	24.0
4/28/96	24.0
4/27/96	24.0
4/26/96	24.0
4/25/96	24.0

SOIL TEMPERATURE HOUR REPORT

- ▲ **Total**

The total number of soil temperature hours which occurred during the selected period of time.

- ▲ **Start Date, End Date, Threshold**

The report shows the start and end dates and the threshold you entered.

- ▲ **Hours for the last 15 days**

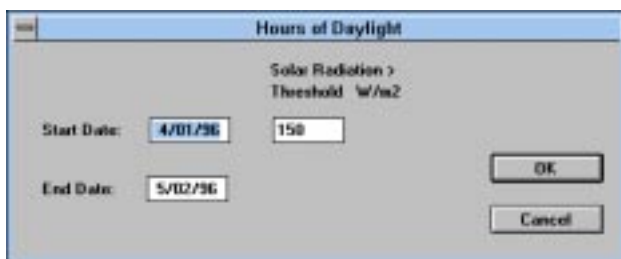
The report shows the number of soil temperature hours which occurred on each of the past 15 days.

Hours of Daylight

The software can calculate the total hours of daylight during any given period. To do so, you must enter a solar radiation threshold above which the software should consider "daylight" (default is 150 W/m²). The software calculates the amount of time the solar radiation was above the threshold and reports that amount of time as the hours of daylight.

1. Choose Hours of Daylight from the Reports menu.

The Hours of Daylight dialog box appears.



HOURS OF DAYLIGHT

2. Enter the following information:

- ▲ **Start Date**

Enter the starting date for which you want hours of daylight calculated into the text box.

- ▲ **End Date**

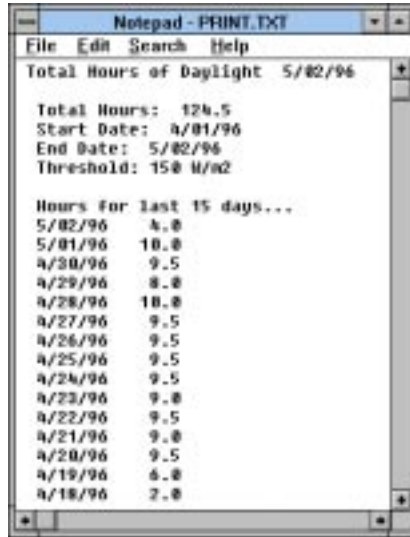
Enter the ending date for which you want hours of daylight calculated into the text box.

- ▲ **Solar Radiation Threshold**

Enter the solar radiation threshold above which you want hours of daylight calculated into the text box.

3. After entering all necessary information, choose OK to view the hours of daylight report.

The software calculates and displays hours of daylight information. The report is opened into Windows' Notepad from which you may copy or print the report information.



HOURS OF DAYLIGHT REPORT

▲ **Total Hours**

The total hours of daylight which occurred during the selected period of time.

▲ **Start Date, End Date, Threshold**

The report shows the start and end dates and the threshold you entered.

▲ **Hours for the last 15 days**

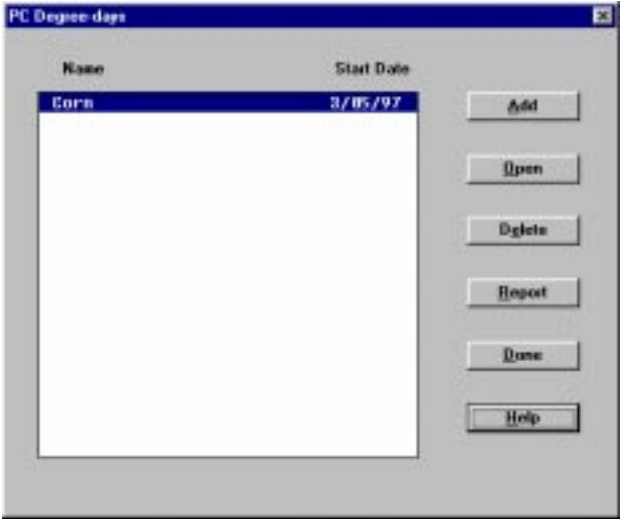
The report shows the hours of daylight which occurred on each of the past 15 days.

PC Degree Days

The software can calculate degree-days for an almost infinite number of crops, pests, etc.

1. Choose PC Degree Days from the Reports menu.

The PC Degree Days list box appears.



PC DEGREE DAYS

2. See "PC Degree-Days" starting on page 88 for instructions on using the degree-day calculation feature.

Leaf Wet Hours

You may track the number of hours during which temperature fell within a certain range *and* a leaf wetness threshold was exceeded.

1. Choose Leaf Wet Hours from the Reports menu.

The Leaf Wet Hours dialog box appears.



LEAF WET HOURS

2. Enter the following information:

▲ **Start Date**

Enter the starting date for which you want leaf wet hours calculated into the text box.

▲ **End Date**

Enter the ending date for which you want leaf wet hours calculated into the text box.

▲ **Low Temp, High Temp**

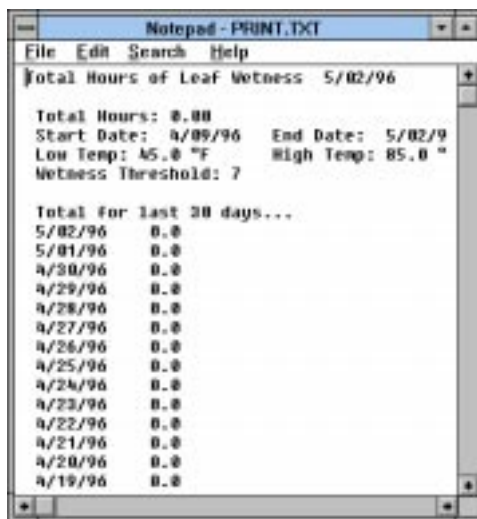
Enter the temperature range between which you want leaf wet hours calculated by entering a low and a high temperature threshold into the appropriate text box.

▲ **Wet Threshold**

The console reports leaf wetness using a scale which runs from 0 (completely dry) to 16 (maximum amount of moisture). Enter the scale number above which you want the software to consider foliage "wet."

3. After entering all necessary information, choose OK.

The software calculates leaf wet hours and displays that information. The report is opened into Windows' Notepad from which you may copy or print the report information.



LEAF WET HOURS REPORT

▲ **Total Hours**

The reports shows the total leaf wet hours during the selected period.

▲ **Start Date, End Date, Low Temp, High Temp, Wetness Threshold**

The report shows the start and end dates and the temperature and wetness the thresholds you entered.

▲ **Total for last 30 days**

The reports shows the total leaf wet hours for each of the past 30 days.

Chilling Requirement

You may calculate chilling requirements by entering a start and end date and a temperature threshold.

1. Choose Chilling Requirement from the Reports menu.

The Chilling Requirement dialog box appears.

The dialog box titled "Chilling Requirement" contains the following elements:

- Start Date:** A text box containing "4/1/96".
- End Date:** A text box containing "7/1/96".
- Temp. Below:** A text box containing "65" followed by a unit selector dropdown set to "°F".
- Total Hours:** A text box that is currently empty.
- Buttons:** "Calculate", "Ok", and "Cancel".

CHILLING REQUIREMENT

2. Enter the following information:

▲ Start Date

Enter the starting date for which you want chilling requirement calculated into the text box.

▲ End Date

Enter the ending date for which you want chilling requirement calculated into the text box.

▲ Temp. below

Enter the temperature below which you want chilling requirement calculated.

3. When finished, choose Calculate.

The software calculates chilling requirement for the selected period and displays that information at the bottom of the dialog box.

The dialog box titled "Chilling Requirement" now shows the calculated result:

- Start Date:** "4/01/96"
- End Date:** "8/22/96"
- Temp. Below:** "65.0" with "°F" selected.
- Total Hours:** "1996.8"
- Buttons:** "Calculate", "Ok", and "Cancel".

CHILLING REQUIREMENT CALCULATED

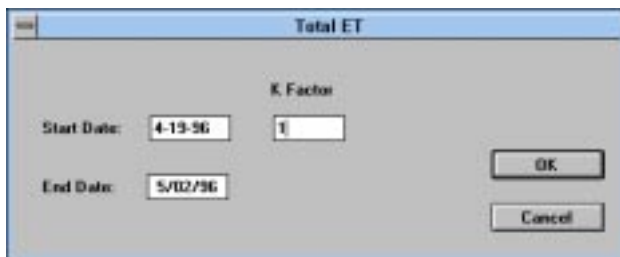
4. To exit, choose Cancel.

Total ET

You may calculate the total ET which has occurred since a specified start date using a single K factor for the entire period.

1. Choose Total ET from the Reports menu.

The Total ET dialog box appears.



The dialog box titled "Total ET" contains the following fields and buttons:

- Start Date:** 4-19-96
- End Date:** 5/02/96
- K Factor:** 1
- OK** button
- Cancel** button

TOTAL ET

2. Enter the following information:

▲ **Start Date**

Enter the starting date for which you want ET calculated into the text box.

▲ **End Date**

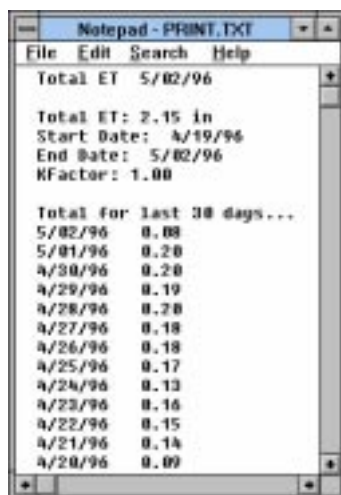
Enter the ending date for which you want ET calculated into the text box.

▲ **K Factor**

Enter the K factor you want used in calculating ET into the text box.

3. When finished, choose OK.

The software calculates ET for the selected period and displays that information. The report is opened into Windows' Notepad from which you may copy or print the report information.



The Notepad window displays the following text:

```

Total ET 5/02/96

Total ET: 2.15 in
Start Date: 4/19/96
End Date: 5/02/96
KFactor: 1.00

Total for last 38 days...
5/02/96 0.08
5/01/96 0.20
4/30/96 0.20
4/29/96 0.19
4/28/96 0.20
4/27/96 0.18
4/26/96 0.18
4/25/96 0.17
4/24/96 0.13
4/23/96 0.16
4/22/96 0.15
4/21/96 0.14
4/20/96 0.09
  
```

ET REPORT

- ▲ **Total ET**
The reports shows the total ET since the start date.
- ▲ **Start Date, End Date, K Factor**
The report shows the start and end dates and the K factor you entered.
- ▲ **Total for last 30 days**
The reports shows the total ET on each of the last 30 days.

Sunrise and Sunset

You may calculate sunrise and sunset times for any location.

NOAA Setup

The software will automatically generate reports similar to Monthly and Yearly NOAA (National Oceanic and Atmospheric Administration) reports. Enter all necessary setup information using NOAA Setup, and the reports can be calculated in seconds.

- 1. Choose NOAA Setup from the Reports menu.
The NOAA Report Setup dialog box appears.

Month	Normal Mean Temp. °F	Normal Precipitation in
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		

NOAA REPORT SETUP

- 2. Enter the following information:
 - ▲ **City**
Enter the city name into the text box.
 - ▲ **State**
Enter the state name into the text box.

▲ **Elevation**

Enter the location's elevation into the text box.

▲ **Lat, Long**

Enter the location's longitude and latitude into the text box. If you entered latitude and Longitude when configuring your station (see "Station Config" on page 30), the software automatically enters those numbers in this dialog box.

▲ **Normal Mean Temp**

Enter the normal mean temperature for each month of the year into the appropriate text box.

▲ **Normal Precipitation**

Enter the normal mean precipitation for each month of the year into the appropriate text box.

3. After entering information, choose OK.

The software saves all NOAA report setup information.

NOAA Summarize Month

The software can automatically generate monthly NOAA reports using the information in your database and NOAA Setup information (see "NOAA Setup" on page 62).

1. Choose NOAA Summarize Month from the Reports menu.

The Choose Month dialog box appears.



CHOOSE MONTH

2. Select a month from the list.

3. Enter the desired file name into the Export File text box.

Whenever you create a monthly summary, the software automatically creates an export file (an ASCII text file) which contains the information and saves that file in the root program directory. You may use the default file name, if desired.

4. Choose OK.

The NOAA Monthly Summary appears.

Browsing "NOAA.MO.TXT"

MONTHLY CLIMATOLOGICAL SUMMARY for JUN. 1995

CITY: Hayward STATE: California ELEVATION 200 FT LATITUDE: 37.33-36 LONGITUDE: -12

TEMPERATURE (°F), RAIN (in), WIND SPEED (mph)

DAY	MOON		HIGH	TIME	LOW	TIME	HIND		COOL		WIND		DOM
	DATE	TIME					DATE	TIME	DATE	TIME	DATE	TIME	
1	48.9	54.5	1:30p	44.9	12:00a	16.1	0.0	0.07	2.7	12.0	1:30p	SE	
2	48.8	57.8	2:30p	41.9	7:30a	16.2	0.0	0.29	1.9	14.0	10:00p	SE	
3	53.5	59.0	2:00p	48.0	12:30a	11.5	0.0	0.13	3.0	15.0	1:30a	SE	
4	52.1	55.5	1:00p	48.4	8:00p	12.9	0.0	0.29	4.6	20.0	8:00a	SE	
5	51.7	54.7	2:00p	50.1	12:30a	13.3	0.0	0.14	5.6	26.0	3:00a	SE	
6	51.9	56.9	10:00p	47.0	8:30a	13.1	0.0	0.30	4.7	31.0	10:30p	SE	
7	54.9	60.2	11:30a	50.1	1:30a	10.1	0.0	0.17	5.6	21.0	12:30a	SE	
8	57.6	60.5	11:30p	54.9	8:30a	7.4	0.0	0.19	8.2	29.0	9:00a	SE	
9	59.2	62.6	2:30p	55.5	8:00p	5.9	0.0	1.19	7.6	30.0	5:30p	SE	
10	59.0	61.5	12:30p	54.5	12:00a	7.0	0.0	0.44	5.5	20.0	4:00p	SE	

NOAA MONTHLY SUMMARY

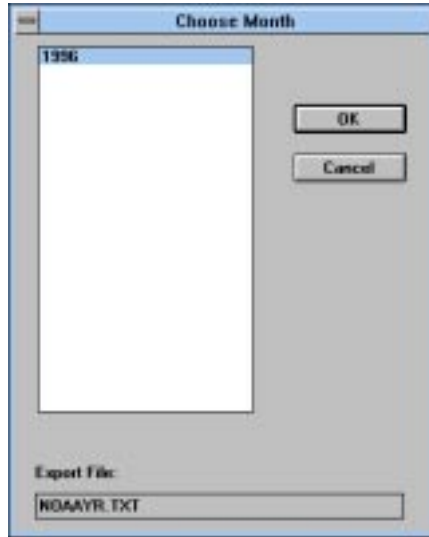
5. To print, choose Print from the Control menu or press Ctrl-P.

6. When finished, double-click on the Control-menu in the upper left corner of the window.

NOAA Summarize Year

The software can automatically generate yearly NOAA reports using the information in your database and NOAA Setup information (see “NOAA Setup” on page 62).

1. Choose NOAA Summarize Year from the Reports menu.
The Choose Year dialog box appears.



CHOOSE YEAR

2. Select a year from the list.
3. Enter the desired file name into the Export File text box.

Whenever you create a yearly summary, the software automatically creates an export file (an ASCII text file) which contains the information and saves that file in the root program directory. You may use the default file name, if desired.

• USING THE SOFTWARE

- *Reports Menu*

4. Choose OK.

The NOAA yearly summary appears.

[illegible]

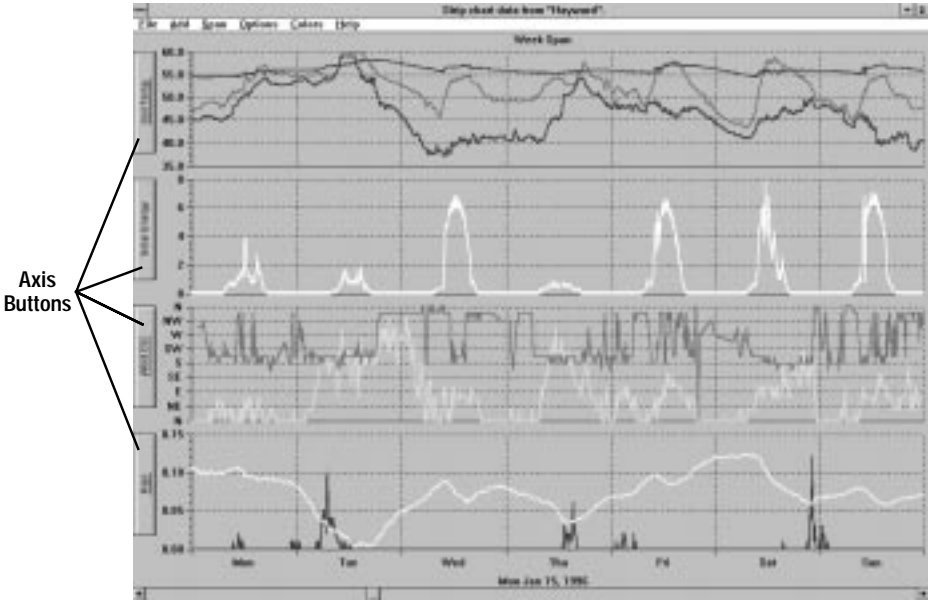
NOAA YEARLY SUMMARY

5. To print, choose Print from the Control menu or press Ctrl-P.

- When finished, double-click on the Control-menu in the upper left corner of the window.

USING THE STRIP CHARTS

The strip charts are four line graphs, stacked one on top of another, onto which you may plot any data contained in your database. The strip charts can be set to update automatically which allows you to view changing weather conditions in real time.



STRIP CHART WINDOW

Strip Chart Basics

Whenever you open the strip chart window, the software automatically downloads data (if necessary) to make sure it has the most current data for the chart. Thereafter, as long as the strip chart is in “auto update” mode, the software will download and update the strip charts at each archive interval. You may select whatever variables (weather conditions) you want plotted onto the four charts, though each chart may display the axis information for only one of the variables. In the strip chart shown above, for example, both rain and barometric pressure are plotted on the bottom strip chart, though the axis button only says Rain and the axis shows the scale for the rainfall graph. You may also select the desired plot span to determine how much data you are viewing at any one time.

▲ Place the strip chart into auto update mode

When you first open the strip chart window, the strip chart is automatically placed into auto update mode. It will remain in that mode (downloading and updating the graphs at each archive interval) until you select to view historical data on the strip charts (see “View Historical Data” below) at which point it is automatically taken out of auto update mode. To return to auto update mode, choose Auto Update from the Options menu. If necessary, the software will download any data in the archive memory and will move to the most current date in the database.

▲ To add a variable to a strip chart

The first step is to select the desired strip chart (top, bottom, etc.) by clicking on the axis button for that strip chart. Then choose the variable you want added to the active strip chart from the Add/Remove menu. Note that any variables already plotted on the active strip chart have check marks next to their name.

▲ Remove Variable

The first step is to select the desired strip chart (top, bottom, etc.) by clicking on the axis button for that strip chart. Then choose the variable you want removed from the active strip chart from the among the variables with check marks next to their name in the Add/Remove menu.

▲ Change Axis Information

Although you may have as many variables as desired on any strip chart, the axis for each strip chart may only display information for one of those variables. To choose the axis information you want displayed, click on the axis button for the desired strip chart. A pop-up menu appears, containing the name (and color) of the variables plotted on this strip chart. Select the desired variable from the pop-up menu.



AXIS BUTTON POP-UP MENU

▲ Change Plot Span

Choose the desired plot span from the Span menu.

▲ View Historical Data

You may use the scroll bar along the bottom of the strip chart window to view historical data on the strip charts. Clicking on the scroll arrows moves the strip chart forward or backward one day at a time. Clicking the scroll bar moves the strip chart one span at a time. Dragging the scroll box allows you to quickly find a specific date. As you drag the scroll box, watch the bottom of the window until the desired date appears, then release the scroll box.

Note: For plot spans which show less than a full day's worth of data, clicking on the scroll arrow and clicking on the scroll bar move the strip chart one plot span at a time.

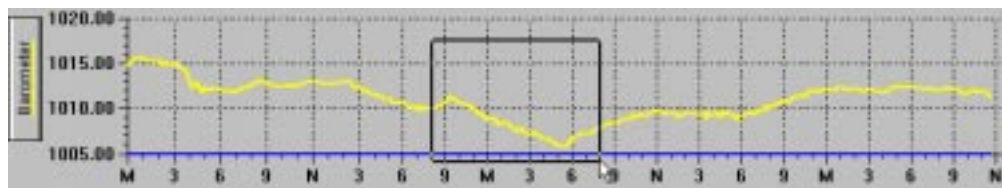
▲ View Database Information

Double-clicking on any location in the strip chart will open the Browse window (see "Using the Browse Window" on page 78) to view the raw data for that time and date.

▲ View Details

Click and drag to select the portion of the strip chart that you wish to see in detail. The software will zoom in on that section of the strip chart, using the closest possible plot span.

Note: Viewing historical data may turn off the Auto Update option (see "Auto Update" on page 71).



CLICK AND DRAG TO SELECT

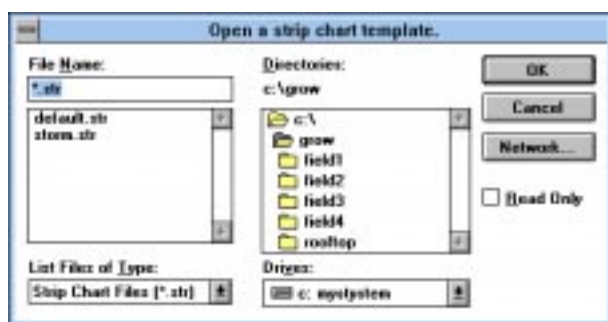
File	Add/Remove	Spa
Open...		Ctrl-O
Save...		Ctrl-S
Make Default		
Print		Ctrl-P
Close		

File Menu

The commands in the File menu allow you to create strip chart templates for later use, set the default strip chart setup, and print the strip charts. Strip chart templates save all information concerning which variables are plotted on the four strip charts, what information is displayed on the axes for each strip chart, and the plot span. It does not save any date information and, when opened, will always show the latest data in your database and be placed into auto update mode.

▲ Open

To open a previously saved strip chart template, choose Open from the File menu and choose the desired strip chart template file.



OPEN STRIP CHART TEMPLATE

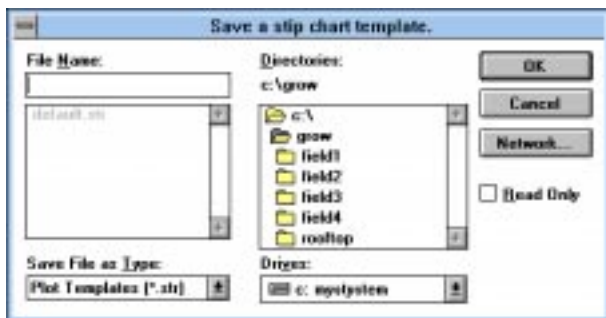
• USING THE SOFTWARE

• Using the Strip Charts

•

▲ Save

To save the current strip chart as a template, choose Save from the File menu. Enter the desired file name and choose OK to save the template.



SAVE STRIP CHART TEMPLATE

▲ Make Default

To make the current strip chart the default strip chart (which appears initially whenever you open the strip chart window), choose Make Default from the File menu.

▲ Print

To print the strip chart window, choose Print from the File menu. Set your printer options in the Print dialog box (for best results, be sure to choose landscape mode) and then choose OK.

▲ Close

To close the strip chart window, choose Close from the File menu.

Add/Remove	Spa
✓ Air Temp.	
✓ Hi Air Temp.	
Low Air Temp.	
E.T.	
Soil Temp.	
Solar Rad.	
Solar Energy	
Degree Days	
Barometer	
Wind Speed	
Hi Wind Speed	
Wind Dir.	
Wind Chill	
Wind Run	
Rain	
Rain Rate	
✓ Humidity	
Dew Point	
Tmp.Hum.Index	

Add/Remove Menu

To add a variable to any of the strip charts, select the desired strip chart (to make it active) and then select the variable you want to add from the Add/Remove menu. To remove a variable from any of the strip charts, select the desired strip chart (to make it active) and then select the variable you want to remove from the Add/Remove menu.

Note: Variables which are plotted on the active strip chart have check marks next to their name.



Span Menu

To change the plot span of the strip charts, select the desired plot span from the Span menu. To “zoom in” one plot span (for example, to go from a plot span of a Week to a plot span of 3 Days), choose Zoom In from the Span menu or press F3. To “zoom out” one plot span (for example, to go from a plot span of 3 Days to a plot span of a Week), choose Zoom Out from the Span menu or press F4.



Options Menu

The commands in the Options menu allow you to change the strip charts’ auto update mode status, lock the strip charts axes, and quickly clear all information from the strip charts.

▲ Auto Update

When in auto update mode, the software downloads data from the archive memory and updates the strip charts at each archive interval. When not in auto update mode, the strip charts do not update in real-time though you may browse historical data. To change the auto update status, choose Auto Update from the Options menu. When the strip charts are in auto update mode, a check mark appears beside the command name.

Note: When you change the auto update status to place the strip charts into auto update mode, the software automatically downloads all data in the archive memory and moves to the most current date in the database.

▲ Lock Axis

To lock (or unlock) the axes of all strip charts, choose Lock Axis from the Options menu. When the strip charts’ axes are locked, a check mark appears beside the command name. Locking the axis will cause subsequent plot spans (when you scroll through plot spans) to use the same scale as the plot span currently being viewed. Data which falls outside of the strip chart scale will have the line “clipped” at the top or bottom of the strip chart.

▲ Clear Plots

To clear all variables from the strip charts (giving you a blank strip chart to work with), choose Clear Plots from the Options menu. The software prompts you to confirm that you want to clear all data before it continues.

• USING THE SOFTWARE

• Using the Strip Charts

•



Colors Menu

You may change the color scheme used by the software in creating strip charts and plots. To change the color used for the plot text, plot background, or any of the variables plotted by the software, choose the appropriate command from the Colors menu. The software opens Windows' Color dialog box from which you may select or create a color.



COLOR DIALOG BOX

▲ Make Default

To save the current color scheme as the default, choose Make Default from the Colors menu. Note that the strip charts and the plots (see “Using the Plot Window” starting on page 73) use the same color scheme. Changing the default color scheme in the strip charts window will change the color scheme used in the plots window.

▲ Load Default

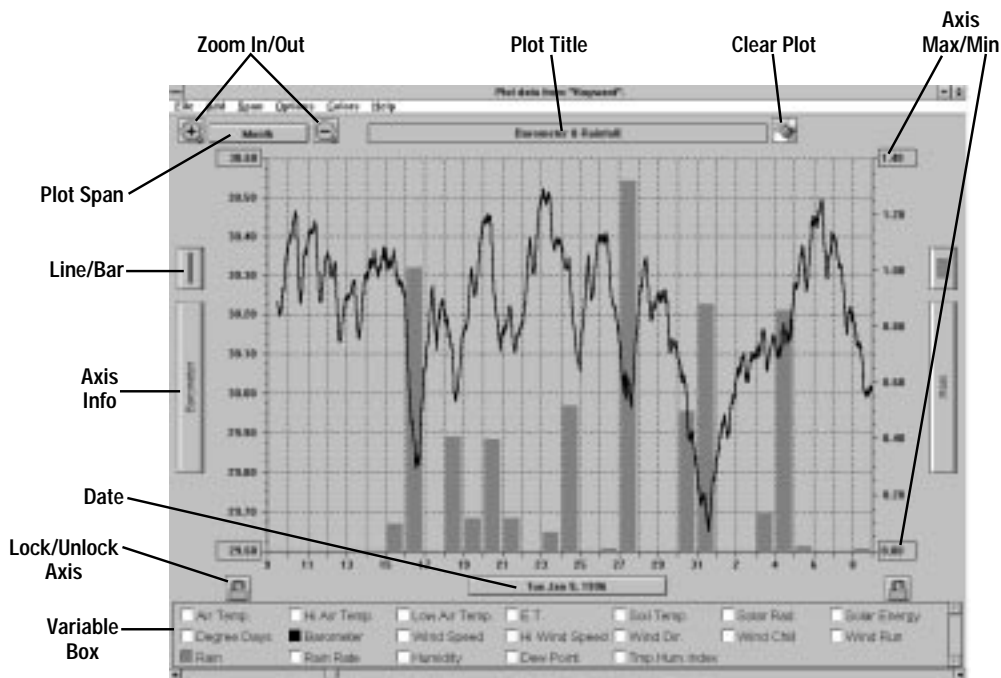
If you have made changes to the color scheme and want to return to a previously saved default color scheme (see above), choose Load Default from the Colors menu.

▲ Load Program Default

To load the original color scheme in which the program displayed plots and strip charts, choose Load Program Default from the Colors menu. If you want to make this color scheme your default once again, you will need to make it the default (see above).

USING THE PLOT WINDOW

The software includes powerful plotting capabilities which allow you to view and compare data in graphical format. The plot interface has been designed so that almost all plot features may be accessed directly from the plot window. You may use menu commands where you find it easier, of course, and those commands are explained separately below.



PLOT WINDOW

Plot Basics

The three most basic elements of any plot are the variables (the weather conditions you are plotting), the date you are plotting, and the plot span (the length of time over which you are plotting those conditions). The software allows you to quickly and simply select those three elements and also includes many other useful features which make it easier to view and compare data. Almost all of the plot features may be accessed directly from the plot window. Menu commands are explained separately below.

▲ Add/Remove Variable

To add or remove a variable from a plot, click on the box next to the variable's name in the Variables Box at the bottom of the plot window. When you add a variable to the plot, the color of that variable fills the box. When you remove a variable, the box becomes white again.

▲ Choose Specific Date

To choose a specific date, click on the Date button. A list of dates in your database appears. Select the desired date from the list and choose OK. For plot spans which show more than one day, the date you pick will be plotted on the left side of the axis and the rest of the plot will fill in with subsequent data. The date which appears on the date button always indicates what data is plotted on the left-most side of the axis.

▲ Scroll Through Dates

You may use the scroll bar along the bottom of the strip chart window to scroll through data. Clicking on the scroll arrows moves the plot forward or backward one day at a time. Clicking the scroll bar moves the plot one plot span at a time. Dragging the scroll box allows you to quickly find a specific date. As you drag the scroll box, watch the bottom of the window until the desired date appears, then release the scroll box.

Note: For plot spans which show less than a full day's worth of data, clicking on the scroll arrow and clicking on the scroll bar move the plot one span at a time.

▲ Choose Plot Span

To choose a plot span, click on the Span button. A pop-up list containing all available plot spans appears. Choose the desired plot span from the list.



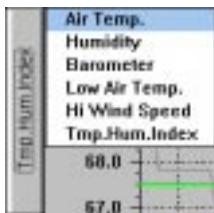
PLOT SPAN LIST

▲ Enter Plot Title

You may enter a plot title into the Plot Title text box at the top of the window.

▲ Choose Axis Information

Although you may have as many variables as desired on any plot, each axis (left/right) on a plot may only display information for one of those variables. To choose the axis information you want displayed, click on the desired Axis Info button. A pop-up menu appears, containing the name (and color) of the variables on this plot. Select the desired variable from the pop-up menu.



AXIS INFO POP-UP LIST

▲ Choose Line/Bar

A line plot simply plots all of the data in the database, drawing a line from one data point to another until it fills out the whole plot span. Bar graphs, on the other hand, show cumulative totals during a specific interval (each day on week and month plots, each month on year plots). You may only use bar graphs for those variables which accumulate totals (rainfall, ET, etc.) and only on plot spans of a week, month, or year.

To select either a bar or line graph, click on the Bar/Line button. A pop-up list appears. Choose either Bar or Line from the list.



BAR/LINE POP-UP LIST

▲ Set Axis Min/Max

You may set your own minimum or maximum for each axis by entering the desired number into the Axis Min/Max text box. Setting the minimum or maximum automatically “locks” the axis (see below).

▲ Lock Axis

To lock (or unlock) the axes of all plots, click on the Lock Axis icon for the desired axis. Locking the axis will cause subsequent plot spans (when you scroll through plot spans) to use the same scale as the plot span currently being viewed. Data which falls outside of the plot scale will have the line or bar “clipped” at the top or bottom of the plot.



CLIPPED DATA

▲ View Database Information

Double-clicking on any location in the plot will open the Browse window (see “Using the Browse Window” on page 78) to view the raw data for that time and date.

▲ View Details

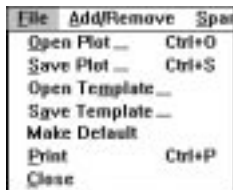
You may click and drag on any section of a plot to view that section in more detail (see “View Details” on page 69).

▲ Zoom In/Out

To “zoom in” one plot span (for example, to go from a plot span of a Week to a plot span of 3 Days), click on the Zoom In icon. To “zoom out” one plot span (for example, to go from a plot span of 3 Days to a plot span of a Week), click on the Zoom Out icon.

▲ Clear Entire Plot

To clear all variables from the plot (giving you a blank plot to work with), click on the Clear Plot icon.



File Menu

The commands in the file menu allow you to save and open plots and plot templates. When you save a plot, all information is stored. When you open that plot, it automatically loads all variables and settings, and plots the data from the date which was on the plot when it was saved. When you save a plot template, all information except for date is stored. When you open a plot template, the software loads all variables and settings, but plots the data from the latest date in the database.

▲ Open Plot

To open a previously saved plot, choose Open Plot from the File menu. Select the desired plot in the Open dialog box and choose OK.

▲ Save Plot

To save a plot, choose Save Plot from the File menu. Enter the desired file name and choose OK.

▲ Open Template

To open a previously saved plot template, choose Open Template from the File menu. Select the desired plot in the Open dialog box and choose OK.

▲ Save Template

To save a plot template, choose Save Template from the File menu. Enter the desired file name and choose OK.

▲ Make Default

To make the current plot the default (which appears initially whenever you open the plot window), choose Make Default from the File menu.

▲ Print

To print a plot, choose Print from the File menu. Set your printer options in the Print dialog box (for best results, be sure to choose landscape mode) and then choose OK.

▲ Close

To exit the plot window, choose Close.



Add/Remove Menu

To add a variable to the plot, choose the variable you want to add from the Add/Remove menu. To remove a variable from the plot, choose the variable you want to remove from the Add/Remove menu.

Note: Variables which are plotted have check marks next to their name.



Span Menu

To change the plot span of the plot, select the desired plot span from the Span menu. To “zoom in” one plot span (for example, to go from a plot span of a Week to a plot span of 3 Days), choose Zoom In from the Span menu or press F3. To “zoom out” one plot span (for example, to go from a plot span of 3 Days to a plot span of a Week), choose Zoom Out from the Span menu or press F4.



Options Menu

The commands in the Options menu allow you to set a variety of plot options.

▲ Gridlines

You may turn the gridlines on or off for the left axis, right axis, and time axis separately. When the gridlines are on, a check mark appears beside the menu command. To change the gridline setting from on to off (or vice versa) choose the appropriate command from the Options menu.

▲ Like Variable Same Scale

Turning this option on facilitates comparison of variables which use the same unit of measure by forcing the software to use the same scale for any variables which use the same unit of measure. When this option is on, a check mark appears beside the menu command. To turn this option on or off, choose Like Variable Same Scale from the Options menu.

▲ Lock Scale

To lock (or unlock) the axes of all plots, choose Lock Scale for the desired axis.

▲ Choose Variable

To choose the axis information you want displayed on either axis, choose Choose Variable for the desired axis. A pop-up menu appears next to the axis information button. Select the desired variable from the pop-up menu

• **USING THE SOFTWARE**
• *Using the Browse Window*
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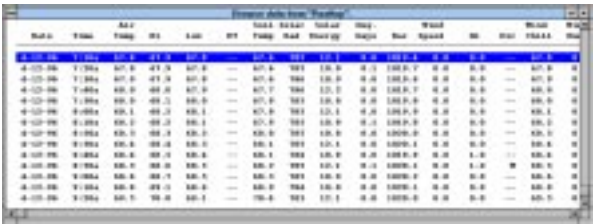
- ▲ **Choose Line/Bar**
To select either a bar or line graph, choose Choose Line/Bar for the desired axis. A pop-up list appears next to the Line/Bar button. Choose either Line or Bar from the list.
- ▲ **Edit Title**
To edit the plot title, choose Edit Title from the options menu. The software moves the cursor to the Plot Title text box.
- ▲ **Edit Min/Max**
To edit the Min/Max setting for either axis, choose the appropriate command from the Options menu. The software moves the cursor to the appropriate Min/Max text box.
- ▲ **Hide Variable Box**
You may hide the Variables Box in order to maximize the size of your plot. When the Variables Box is hidden, a check mark appears beside the menu command. To turn this option on or off, choose Hide Variable Box from the Options menu.
- ▲ **Clear Plot**
To clear all variables from the plot (giving you a blank plot to work with), choose Clear Plot from the Options menu.

Colors Menu

You may change the color scheme used by the software in creating strip charts and plots. For instructions, see “Colors Menu” on page 72.

USING THE BROWSE WINDOW

The browse window allows you to view, edit, print, annotate, and export the raw data collected by the WeatherLink.



BROWSE WINDOW

All of the menu commands are explained in separate sections below, however there are a several useful operations you may perform directly from the browse window.

▲ Edit a Record

To edit a record, double-click on the desired record. The Edit Record dialog box appears.

Edit 4-18-96 10:00a			
Air Temp.	70.8 °F	High Wind Speed	0.0 mph
Hi Air Temp.	71.0 °F	Wind Direction	—
Low Air Temp.	70.5 °F	Wind Chill	70.8 °F
E.T.	— in	Wind Run	0.0 mi
Soil Temp.	70.8 °F	Rain	0.0 in
Solar Rad.	783.0 W/m2	Rain Rate	0.0 in/hr
Solar Energy	11 Lj	Humidity	43
Degree Days	0.0 °F	Dew Point	47.2 °F
Barometer	1022.5 mb	Temp. Hum. Index	69.0 °F
Wind Speed	0.0 mph		

OK Cancel Next Previous

EDIT RECORD

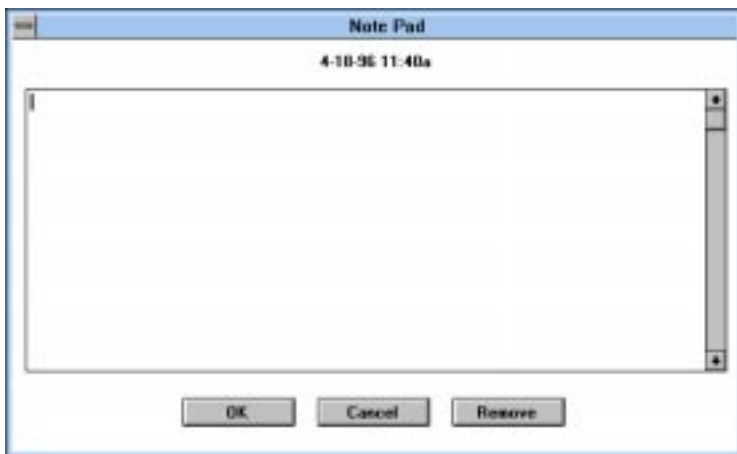
The date and time of the record appear in the title bar. You may enter or change any of the record data by simply entering the desired data into the appropriate text box.

If data is either missing or invalid, you can enter two dashes (“--”) to indicate that that data point is unavailable. (See E.T. and Wind Direction above.) Note that certain readings (i.e., Degree Days, Wind Speed, High Wind Speed, Wind Run, and Rain), use “0.0” instead of the dashes.

When finished, choose OK to save the changes and return to the Browser window. Alternatively, choose Next to save your changes and move to the next record in the database or choose Previous to save your changes and move to the previous record in the database.

▲ Annotate a Record

To add a note, double-click on the area just to the left of a record's date. The Note Pad appears.



NOTE PAD

Enter the desired note into the note pad. When finished, choose OK to save the note and return to the browse window. After you add a note to a record, the software adds a note icon to the left of the record.

Browse data from Rooftop.											
File Edit											
	Date	Time	Air Temp	Hi	Low	ET	Soil Temp	Solar Rad	Solar Energy	Deg. Days	Bar
	4-18-96	9:40a	70.3	70.4	70.3	--	70.1	783	10.8	0.0	1022.2
NOTE	4-18-96	9:50a	70.5	70.6	70.4	--	70.4	783	12.1	0.1	1022.2
	4-18-96	10:00a	70.8	71.0	70.6	--	70.8	783	10.8	0.0	1022.5
	4-18-96	10:10a	71.1	71.2	71.0	--	71.1	783	10.9	0.0	1022.7

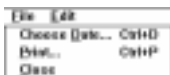
NOTE ICON

To edit, delete, or add to an existing note, double click on the note icon. The Note Pad (with the text of previously entered notes) appears. Edit or add to the note and choose OK to save. Choose Remove to delete the note completely.

▲ Delete a Record

To delete a record, select the desired record and press Delete. The software prompts you to confirm that you wish to delete the record before it continues.

To quickly delete a group of records, see "Delete Records" on page 84.

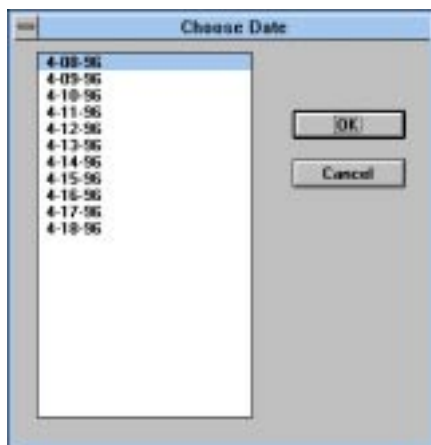


File Menu

The commands in the file menu allow you to select the date you want displayed in the browse window and print data.

▲ Choose Date

To select a specific date which you want displayed in the browse window, choose Choose Date from the File menu. The Choose date dialog box appears.

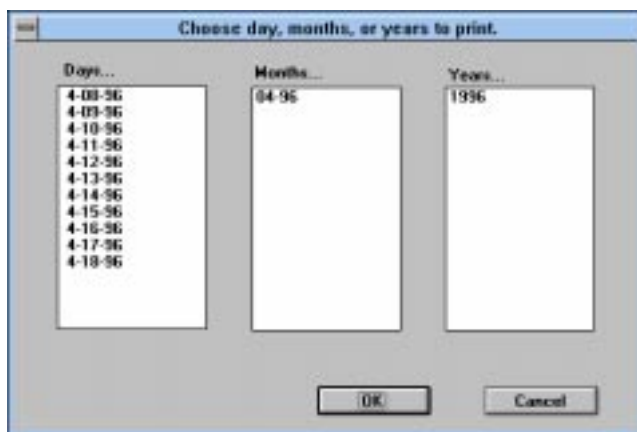


CHOOSE DATE

Select the desired date from the list and choose OK. The software will move to the first record on the selected date.

▲ Print

To print data, choose Print from the File menu. The software prompts you to select the day, month, or year you want printed.



CHOOSE RECORDS TO PRINT

Select the desired days, months, or years (you may choose more than one) and choose OK. Set your printer options in the Print dialog box (for best results, be sure to choose landscape mode) and then choose OK.

▲ Close

To close the browse window, choose Close from the File menu.

Edit	
Make a Note...	Ctrl+N
Edit...	Enter
Delete	Del
Copy Records...	
Export Records...	
Delete Records...	

Edit Menu

The commands in the Edit menu allow you to edit and delete records, annotate records, and to copy and export records.

▲ Make a Note

To add a note to a record, select the desired record and choose Make a Note from the Edit menu. (See “Annotate a Record” on page 80 for details on adding notes to records.)

▲ Edit

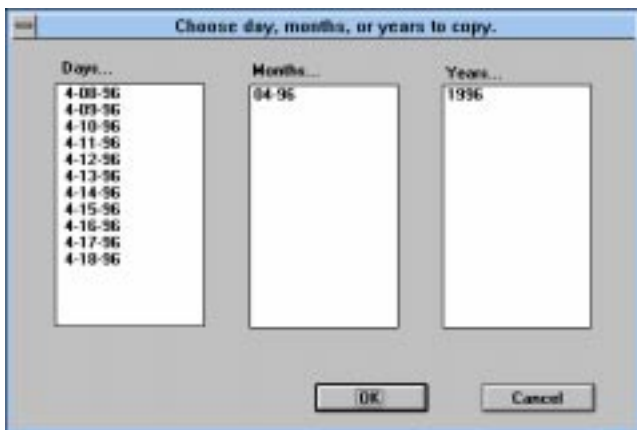
To edit a record, select the desired record and choose Edit from the Edit menu. (See “Edit a Record” on page 79 for details on editing records.)

▲ Delete

To delete a single record, select the desired record and choose Delete from the Edit menu. The software prompts you to confirm that you want to delete the selected record before it continues.

▲ Copy Records

To copy all record information for a specific group of records to Windows clipboard (from which you may paste the information into most Windows programs), choose Copy records from the Edit menu. The software prompts you to select the records you want copied.

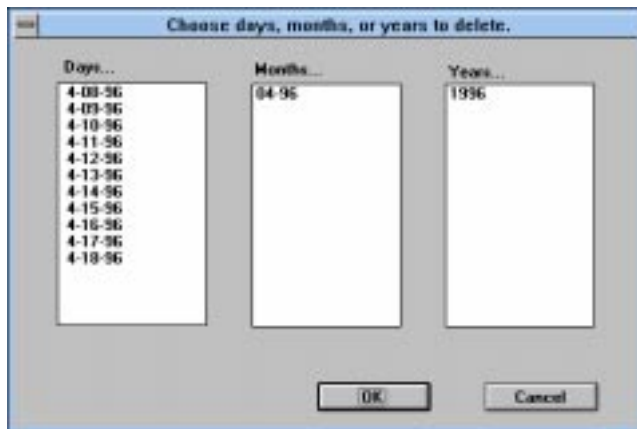


CHOOSE RECORDS TO COPY

Select the desired days, months, or years (you may choose more than one) and choose OK. The software copies the selected to the clipboard.

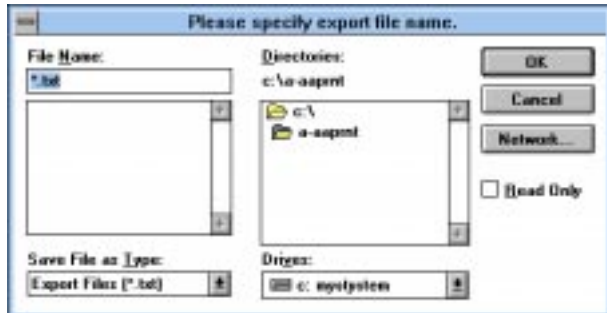
▲ Export Records

To export record information to a tab delimited export file, choose Export from the Edit menu. The software prompts you to select the records you want exported.



CHOOSE RECORDS TO EXPORT

Select the desired days, months, or years (you may choose more than one) and choose OK. The software prompts you to enter an export file name. Enter the desired file name and choose OK.

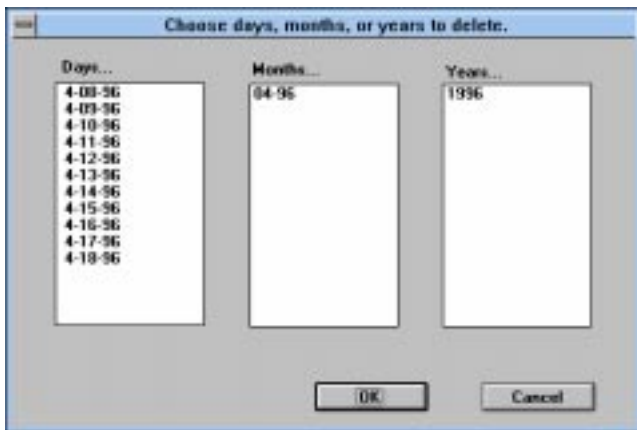


ENTER EXPORT FILE NAME

The software saves all record information for the selected days, months, or years (in tab delimited format) into the export file. You may use this file to import data into most popular spreadsheet and database software.

▲ Delete Records

To quickly delete a group of records at one time, choose Delete Records from the Edit menu. The software prompts you to select the records you want deleted.



CHOOSE RECORDS TO DELETE

Select the desired days, months, or years (you may choose more than one) and choose OK. The software deletes the selected records.

CROP WATER MANAGEMENT

The GroWeatherLink software includes a versatile crop water management feature which allows you to track, graph, and print crop-specific EvapoTranspiration and irrigation information. This section of the manual explains how to use the features of the Crop Water Management dialog box. For information on adding, deleting, and opening crops, see “Crop Menu” on page 50.

CROP WATER MANAGEMENT DIALOG BOX

Irrigation

When you irrigate a crop, enter the irrigation amount. The software will automatically calculate total irrigation amounts based on your entries.

Note: The software does not convert irrigation amounts from inches to mm (or vice versa) when you change the units of measure in which data is displayed.

▲ Add Irrigation Amount

To add an irrigation amount, click on the Irrigate button and choose Add Amount from the pop-up menu. The software prompts you to enter an irrigation date and amount. Enter the appropriate information and choose OK. The software adds the irrigation amount to the Irrigation Amt. list.

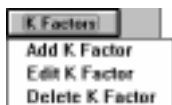
ADD IRRIGATION AMOUNT

▲ Edit Irrigation Entry

To edit an irrigation entry, double-click on the desired line in the Irrigation Amt. List. Edit any of the irrigation information and choose OK to save you changes.

▲ Delete Irrigation Entry

To delete an irrigation entry, select the desired line in the Irrigation Amt. list, click on the Irrigate button, and then choose Delete Amount from the pop-up menu. You will be prompted to confirm that you want to delete the irrigation entry.



K Factors

Crop-specific K factors allow you to calculate more accurate evapotranspiration amounts by taking into account the different transpiration rates of different crops and at different stages of development. When K factors are used to calculate evapotranspiration, it is referred to as ET_c. The software will automatically calculate ET_c using the K factors you enter and the ET_o information calculated by the station.

The software allows you to enter different K factors for different stages of crop development. ET_c for each day is calculated using the appropriate K factor. For example, if you enter a K factor of 1.0 for 4-1-96 and a K factor of 1.25 for 4-15-96, the software uses the 1.0 K factor in calculating ET_c for 4-1-96 through 4-14-96 (inclusive). For 4-15-96 and all subsequent dates (until a new K factor is entered for a date after 4-15-96), the software uses the 1.25 K factor in calculating ET_c.

▲ Add K Factor

To add a K factor, click on the K Factor button and choose Add K Factor from the pop-up menu. The software prompts you to enter an date and K factor. Enter the appropriate information and choose OK. The software adds the K factor to the K Factors list.



ADD K FACTOR

▲ Edit K Factor

To edit a K factor, double-click on the desired line in the K Factors List. Edit any of the irrigation information and choose OK to save you changes.

▲ Delete K Factor

To delete a K factor, select the desired line in the K Factors list, click on the K Factors button, and then choose Delete K Factor from the pop-up menu.

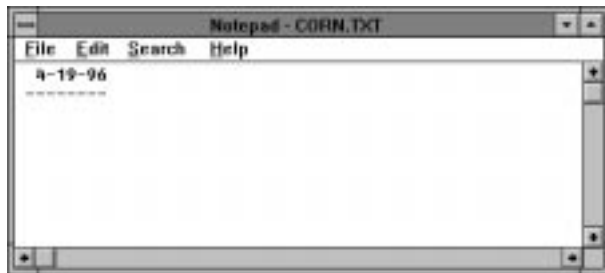
Print

To print all of the crop water management information for a crop, click on the Print button. Set your printer options in the Print dialog box and then choose OK to begin printing.

Note: *If you want Total ETc and irrigation amounts to appear on your print out, you must calculate them before printing (see "Calculate" on page 87).*

Notes

Each crop record has its own note file into which you may place any desired information. To open the note file, click on the Notes button.



CROP NOTE FILE

The software automatically "date stamps" the entry with the current date each time you open the note file. You may, of course, edit or delete the date stamp. Enter any desired notes into the note file, and choose Exit from the File menu when finished. Be sure to save your changes when you exit.

Note: *The software uses Windows Notepad to maintain the note file for each crop. Consult your Windows documentation for a full explanation of Notepad's features and commands. You should not change the file name of the note file when saving or the software will not be able to locate it.*

Graph

To view a quick graph of Daily and Total ETc and Irrigation, click on the Graph button. A graph showing Total ETc, Total Irrigation, and Daily ETc appears. To add a note to the crop record's note file when viewing the graph, double-click anywhere in the graph window. To print the graph, choose Print from the Control menu. To close the graph window, double-click on the Control menu box in the upper left of the window.

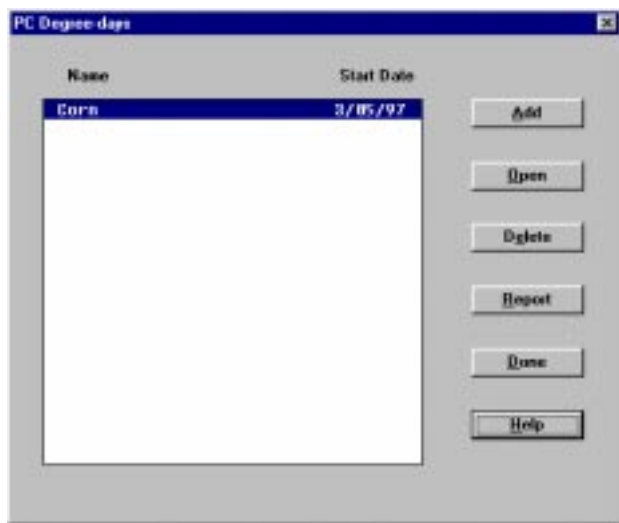
Calculate

To calculate total ETc and irrigation since a certain date, enter the desired start date and end dates for the calculations into the appropriate text box and click on the Calc. Totals button. The software calculates total ETc and irrigation since that date and displays that information at the bottom of the dialog box.

- USING THE SOFTWARE
- *PC Degree-Days*
-

PC DEGREE-DAYS

The software includes a versatile degree-day calculation feature which allows you to track an almost unlimited number of degree-day totals. This section of the manual explains how to use the PC degree-days feature.



PC DEGREE DAYS

Adding a Degree-Day Total

You need to enter a separate degree-day total for every individual crop, pest, etc. for which you want to track degree-days.

1. From the PC Degree-Days list box, choose Add.

The PC Degree-Day Definition dialog box appears.

PC DEGREE-DAY DEFINITION

2. Enter the following information for each degree-day total:

▲ **Name**

Enter the name of the crop, pest, etc. into the text box.

▲ **Start Date**

Enter the starting date for degree-day calculations into the text box.

▲ **Base Temp.**

Enter the base developmental threshold (the temperature at and below which development stops) into the text box.

▲ **Upper Temp.**

Enter the upper developmental threshold (the temperature at and above which development rate remains constant) into the text box.

▲ **Development Total**

Enter the number of degree-days required for this crop/pest to develop into the text box.

▲ Degree-Day Calculation Method

Choose the method by which degree-days are calculated.

▲ Growing Degree-Day “Cut-Off” Method

The software uses the highest temperature and the lowest temperature for a given day to calculate the average temperature for that day. Note, however, that if the low temperature is below the base threshold, the software uses the base threshold as the low temperature when determining average temperature for the day. In addition, if the high temperature is above the upper threshold, the software uses the upper threshold as the high temperature when determining average temperature. For this method, both thresholds must be entered.

The difference between the average temperature and the base threshold is assumed to be the number of degree-days accumulated on that day. (For example, if the average of the highest and lowest temperatures was 24° above the base threshold, the software would assume 24 degree-days for the entire day.)

Note: Unless 15 hours worth of records exist in the database for a day (through 3pm), the software will not calculate degree-days for that day.

▲ High/Low Method

The software uses the highest temperature and the lowest temperature for a given day to calculate the average temperature for that day. Note, however, that if the high temperature is above the upper threshold the software uses the upper threshold as the high temperature when determining average temperature for the day. (If no upper threshold is entered, the high temperature will not be “cut off” in this way.) For this method, the upper threshold need not be entered.

The difference between the average temperature and the base threshold is assumed to be the number of degree-days accumulated on that day. (For example, if the average of the highest and lowest temperatures was 24° above the base threshold, the software would assume 24 degree-days for the entire day.)

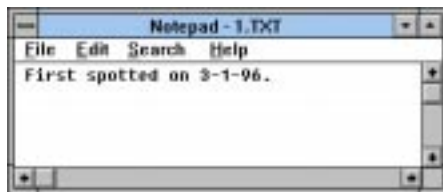
Note: Unless 15 hours worth of records exist in the database for a day (through 3pm), the software will not calculate degree-days for that day.

▲ Integration Method

The software calculates degree-days using the average temperature for an interval and the interval time. For example, if the average temperature during a 15 minute interval was 24° above the base threshold, the software would calculate 0.25 degree-days during that interval ($24^{\circ} * 15 \text{ minutes in interval} / 1440 \text{ minutes per day}$). The number of degree-days during each interval are added together to arrive at a degree-day total. This method calculates degree-day totals more accurately than the high/low method.

3. To add a note to this degree-day total, choose Notes.

The software opens the note file for this degree-day total. You may enter any desired notes into this file.



NOTE FILE

4. To view total degree-days since the start date, choose Calculate.

The software calculates the total degree-days since the start date and displays the number of accumulated degree-days and the degree-days left until the development total is reached.



DEGREE-DAYS CALCULATED

5. After entering all necessary information, choose OK.

The software saves the degree-day information for this crop/pest. Instead of closing, the PC degree-day definition dialog box remains open so you can enter information on the next crop/pest. When finished entering information for all crops/pests, choose Done.

- USING THE SOFTWARE

- PC Degree-Days

- Opening a Degree-Days Total

You may open a previously saved degree-day total to edit information, add notes, view degree-day totals, etc.

1. To open a degree-day total, double click on the desired total or select it from the list and choose Open.

The Degree-Day Definition dialog box for that total appears.

Degree-Day Definition

Name:

Start Date:

Base Temp: °C

Upper Temp: °C

Development Total:

Method of Calculation

☒ Growing Degree-Day "Cut-Off" Method (g)

☐ High/Low Method

☐ Integration Method

Calculate

Deg. Days :

Deg. Days Left to Go:

Data File: C:\DAVIS\GROW\GROWEATH\DEGDAY51.dat

DEGREE-DAY DEFINITION

2. You may enter or change any information, add notes, or calculate degree-day totals as explained in "Adding a Degree-Day Total" on page 89.

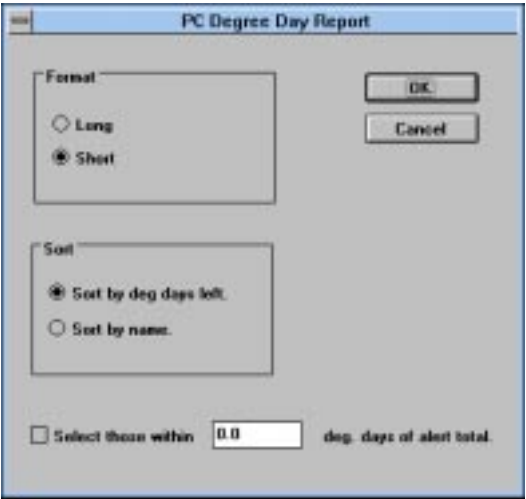
Deleting a Degree-Day Total

To delete a degree-day total, select it from the list and choose Delete. The software will prompt you to confirm that you want to delete the total before doing so.

PC Degree-Day Report

The software allows you to create reports on some or all of your degree-day totals. The report is opened into Windows Notepad from which you may copy or print the report information.

1. From the PC Degree-Days list, choose Report.
The PC Degree-Day Report dialog box appears.



The dialog box titled "PC Degree Day Report" contains two sections: "Format" and "Sort". In the "Format" section, the "Short" radio button is selected. In the "Sort" section, the "Sort by deg days left" radio button is selected. At the bottom, there is a checkbox labeled "Select those within" followed by a text box containing "0.0" and the text "deg. days of alert total." To the right of these sections are "OK" and "Cancel" buttons.

PC DEGREE-DAY REPORT

2. Set the following report options:

▲ **Format**

Select either the long or the short report format.

Notepad - DEGREE.DAT

File Edit Search Help

Degree Day Report 1/10/96

California Red Scale

Start Date	1/1/96
Base Temp	50.0 °F
Upper Temp	90.0 °F
Total for previous 7 days -	
1/1/96	10.0
1/11/96	20.0
2/1/96	30.0
2/11/96	40.0
3/1/96	50.0
3/11/96	60.0
3/21/96	70.0
4/1/96	80.0
4/11/96	90.0
4/21/96	100.0
5/1/96	110.0
5/11/96	120.0
5/21/96	130.0
6/1/96	140.0
6/11/96	150.0
6/21/96	160.0
7/1/96	170.0
7/11/96	180.0
7/21/96	190.0
8/1/96	200.0
8/11/96	210.0
8/21/96	220.0
9/1/96	230.0
9/11/96	240.0
9/21/96	250.0
10/1/96	260.0
10/11/96	270.0
10/21/96	280.0
11/1/96	290.0
11/11/96	300.0
11/21/96	310.0
12/1/96	320.0
12/11/96	330.0
12/21/96	340.0
1/1/97	350.0
1/11/97	360.0
1/21/97	370.0
2/1/97	380.0
2/11/97	390.0
2/21/97	400.0
3/1/97	410.0
3/11/97	420.0
3/21/97	430.0
4/1/97	440.0
4/11/97	450.0
4/21/97	460.0
5/1/97	470.0
5/11/97	480.0
5/21/97	490.0
6/1/97	500.0
6/11/97	510.0
6/21/97	520.0
7/1/97	530.0
7/11/97	540.0
7/21/97	550.0
8/1/97	560.0
8/11/97	570.0
8/21/97	580.0
9/1/97	590.0
9/11/97	600.0
9/21/97	610.0
10/1/97	620.0
10/11/97	630.0
10/21/97	640.0
11/1/97	650.0
11/11/97	660.0
11/21/97	670.0
12/1/97	680.0
12/11/97	690.0
12/21/97	700.0
1/1/98	710.0
1/11/98	720.0
1/21/98	730.0
2/1/98	740.0
2/11/98	750.0
2/21/98	760.0
3/1/98	770.0
3/11/98	780.0
3/21/98	790.0
4/1/98	800.0
4/11/98	810.0
4/21/98	820.0
5/1/98	830.0
5/11/98	840.0
5/21/98	850.0
6/1/98	860.0
6/11/98	870.0
6/21/98	880.0
7/1/98	890.0
7/11/98	900.0
7/21/98	910.0
8/1/98	920.0
8/11/98	930.0
8/21/98	940.0
9/1/98	950.0
9/11/98	960.0
9/21/98	970.0
10/1/98	980.0
10/11/98	990.0
10/21/98	1000.0
11/1/98	1010.0
11/11/98	1020.0
11/21/98	1030.0
12/1/98	1040.0
12/11/98	1050.0
12/21/98	1060.0
1/1/99	1070.0
1/11/99	1080.0
1/21/99	1090.0
2/1/99	1100.0
2/11/99	1110.0
2/21/99	1120.0
3/1/99	1130.0
3/11/99	1140.0
3/21/99	1150.0
4/1/99	1160.0
4/11/99	1170.0
4/21/99	1180.0
5/1/99	1190.0
5/11/99	1200.0
5/21/99	1210.0
6/1/99	1220.0
6/11/99	1230.0
6/21/99	1240.0
7/1/99	1250.0
7/11/99	1260.0
7/21/99	1270.0
8/1/99	1280.0
8/11/99	1290.0
8/21/99	1300.0
9/1/99	1310.0
9/11/99	1320.0
9/21/99	1330.0
10/1/99	1340.0
10/11/99	1350.0
10/21/99	1360.0
11/1/99	1370.0
11/11/99	1380.0
11/21/99	1390.0
12/1/99	1400.0
12/11/99	1410.0
12/21/99	1420.0
1/1/00	1430.0
1/11/00	1440.0
1/21/00	1450.0
2/1/00	1460.0
2/11/00	1470.0
2/21/00	1480.0
3/1/00	1490.0
3/11/00	1500.0
3/21/00	1510.0
4/1/00	1520.0
4/11/00	1530.0
4/21/00	1540.0
5/1/00	1550.0
5/11/00	1560.0
5/21/00	1570.0
6/1/00	1580.0
6/11/00	1590.0
6/21/00	1600.0
7/1/00	1610.0
7/11/00	1620.0
7/21/00	1630.0
8/1/00	1640.0
8/11/00	1650.0
8/21/00	1660.0
9/1/00	1670.0
9/11/00	1680.0
9/21/00	1690.0
10/1/00	1700.0
10/11/00	1710.0
10/21/00	1720.0
11/1/00	1730.0
11/11/00	1740.0
11/21/00	1750.0
12/1/00	1760.0
12/11/00	1770.0
12/21/00	1780.0
1/1/01	1790.0
1/11/01	1800.0
1/21/01	1810.0
2/1/01	1820.0
2/11/01	1830.0
2/21/01	1840.0
3/1/01	1850.0
3/11/01	1860.0
3/21/01	1870.0
4/1/01	1880.0
4/11/01	1890.0
4/21/01	1900.0
5/1/01	1910.0
5/11/01	1920.0
5/21/01	1930.0
6/1/01	1940.0
6/11/01	1950.0
6/21/01	1960.0
7/1/01	1970.0
7/11/01	1980.0
7/21/01	1990.0
8/1/01	2000.0
8/11/01	2010.0
8/21/01	2020.0
9/1/01	2030.0
9/11/01	2040.0
9/21/01	2050.0
10/1/01	2060.0
10/11/01	2070.0
10/21/01	2080.0
11/1/01	2090.0
11/11/01	2100.0
11/21/01	2110.0
12/1/01	2120.0
12/11/01	2130.0
12/21/01	2140.0
1/1/02	2150.0
1/11/02	2160.0
1/21/02	2170.0
2/1/02	2180.0
2/11/02	2190.0
2/21/02	2200.0
3/1/02	2210.0
3/11/02	2220.0
3/21/02	2230.0
4/1/02	2240.0
4/11/02	2250.0
4/21/02	2260.0
5/1/02	2270.0
5/11/02	2280.0
5/21/02	2290.0
6/1/02	2300.0
6/11/02	2310.0
6/21/02	2320.0
7/1/02	2330.0
7/11/02	2340.0
7/21/02	2350.0
8/1/02	2360.0
8/11/02	2370.0
8/21/02	2380.0
9/1/02	2390.0
9/11/02	2400.0
9/21/02	2410.0
10/1/02	2420.0
10/11/02	2430.0
10/21/02	2440.0
11/1/02	2450.0
11/11/02	2460.0
11/21/02	2470.0
12/1/02	2480.0
12/11/02	2490.0
12/21/02	2500.0
1/1/03	2510.0
1/11/03	2520.0
1/21/03	2530.0
2/1/03	2540.0
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2/21/03	2560.0
3/1/03	2570.0
3/11/03	2580.0
3/21/03	2590.0
4/1/03	2600.0
4/11/03	2610.0
4/21/03	2620.0
5/1/03	2630.0
5/11/03	2640.0
5/21/03	2650.0
6/1/03	2660.0
6/11/03	2670.0
6/21/03	2680.0
7/1/03	2690.0
7/11/03	2700.0
7/21/03	2710.0
8/1/03	2720.0
8/11/03	2730.0
8/21/03	2740.0
9/1/03	2750.0
9/11/03	2760.0
9/21/03	2770.0
10/1/03	2780.0
10/11/03	2790.0
10/21/03	2800.0
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11/11/03	2820.0
11/21/03	2830.0
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1/1/04	2870.0
1/11/04	2880.0
1/21/04	2890.0
2/1/04	2900.0
2/11/04	2910.0
2/21/04	2920.0
3/1/04	2930.0
3/11/04	2940.0
3/21/04	2950.0
4/1/04	2960.0
4/11/04	2970.0
4/21/04	2980.0
5/1/04	2990.0
5/11/04	3000.0
5/21/04	3010.0
6/1/04	3020.0
6/11/04	3030.0
6/21/04	3040.0
7/1/04	3050.0
7/11/04	3060.0
7/21/04	3070.0
8/1/04	3080.0
8/11/04	3090.0
8/21/04	3100.0
9/1/04	3110.0
9/11/04	3120.0
9/21/04	3130.0
10/1/04	3140.0
10/11/04	3150.0
10/21/04	3160.0
11/1/04	3170.0
11/11/04	3180.0
11/21/04	3190.0
12/1/04	3200.0
12/11/04	3210.0
12/21/04	3220.0
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1/11/05	3240.0
1/21/05	3250.0
2/1/05	3260.0
2/11/05	3270.0
2/21/05	3280.0
3/1/05	3290.0
3/11/05	3300.0
3/21/05	3310.0
4/1/05	3320.0
4/11/05	3330.0
4/21/05	3340.0
5/1/05	3350.0
5/11/05	3360.0
5/21/05	3370.0
6/1/05	3380.0
6/11/05	3390.0
6/21/05	3400.0
7/1/05	3410.0
7/11/05	3420.0
7/21/05	3430.0
8/1/05	3440.0
8/11/05	3450.0
8/21/05	3460.0
9/1/05	3470.0
9/11/05	3480.0
9/21/05	3490.0
10/1/05	3500.0
10/11/05	3510.0
10/21/05	3520.0
11/1/05	3530.0
11/11/05	3540.0
11/21/05	3550.0
12/1/05	3560.0
12/11/05	3570.0
12/21/05	3580.0
1/1/06	3590.0
1/11/06	3600.0
1/21/06	3610.0
2/1/06	3620.0
2/11/06	3630.0
2/21/06	3640.0
3/1/06	3650.0
3/11/06	3660.0
3/21/06	3670.0
4/1/06	3680.0
4/11/06	3690.0
4/21/06	3700.0
5/1/06	3710.0
5/11/06	3720.0
5/21/06	3730.0
6/1/06	3740.0
6/11/06	3750.0
6/21/06	3760.0
7/1/06	3770.0
7/11/06	3780.0
7/21/06	3790.0
8/1/06	3800.0
8/11/06	3810.0
8/21/06	3820.0
9/1/06	3830.0
9/11/06	3840.0
9/21/06	3850.0
10/1/06	3860.0
10/11/06	3870.0
10/21/06	3880.0
11/1/06	3890.0
11/11/06	3900.0
11/21/06	3910.0
12/1/06	3920.0
12/11/06	3930.0
12/21/06	3940.0
1/1/07	3950.0
1/11/07	3960.0
1/21/07	3970.0
2/1/07	3980.0
2/11/07	3990.0
2/21/07	4000.0
3/1/07	4010.0
3/11/07	4020.0
3/21/07	4030.0
4/1/07	4040.0
4/11/07	4050.0
4/21/07	4060.0
5/1/07	4070.0
5/11/07	4080.0
5/21/07	4090.0
6/1/07	4100.0
6/11/07	4110.0
6/21/07	4120.0
7/1/07	4130.0
7/11/07	4140.0
7/21/07	4150.0
8/1/07	4160.0
8/11/07	4170.0
8/21/07	4180.0
9/1/07	4190.0
9/11/07	4200.0
9/21/07	4210.0
10/1/07	4220.0
10/11/07	4230.0
10/21/07	4240.0
11/1/07	4250.0
11/11/07	4260.0
11/21/07	4270.0
12/1/07	4280.0
12/11/07	4290.0
12/21/07	4300.0
1/1/08	4310.0
1/11/08	4320.0
1/21/08	4330.0
2/1/08	4340.0
2/11/08	4350.0
2/21/08	4360.0
3/1/08	4370.0
3/11/08	4380.0
3/21/08	4390.0
4/1/08	4400.0
4/11/08	4410.0
4/21/08	4420.0
5/1/08	4430.0
5/11/08	4440.0
5/21/08	4450.0
6/1/08	4460.0
6/11/08	4470.0
6/21/08	4480.0
7/1/08	4490.0
7/11/08	4500.0
7/21/08	4510.0
8/1/08	4520.0
8/11/08	4530.0
8/21/08	4540.0
9/1/08	4550.0
9/11/08	4560.0
9/21/08	4570.0
10/1/08	4580.0
10/11/08</	

▲ **Sort**

Select the sort order. You may sort by the number of degree days remaining until the development total (which will show the totals closest to the development total at the top of the report) or you may sort by name which will show totals in alphabetical order.

▲ **Degree-Day Selection check box**

By selecting this check box and entering a number of degree-days into the text box, you may choose to include only those crops/pests whose degree-day totals are within the specified number of degree-days of their development total.

3. **When finished setting options, choose OK.**

The software calculates and displays degree-days information. Depending on which format you chose (long, short), the report shows you some or all of the following information for each degree-day total:

▲ **Start Date, Base Temp, Upper Temp**

The report shows the start date and the base and upper thresholds you entered.

▲ **Total for previous 7 days**

The report shows the total degree-days for each of the last 7 days.

▲ **Total**

The report shows the total degree-days since the start date.

▲ **Development Total**

The report shows the development total you entered.

▲ **Deg-Days Left**

The report shows the total degree-days left before the development total is reached.

▲ **Days to Go**

The report shows the expected number of days before the development total is reached. This calculation is based on the average number of degree-days during the last three days.

5 TECHNICAL REFERENCE

This chapter covers several technical topics which may help you better understand and use the software.

ARCHIVE MEMORY VS. DATABASE

There are two places where the WeatherLink stores weather data: the archive memory and the database.

Archive Memory

The archive is the weather information stored in the WeatherLink itself. At each archive interval the WeatherLink stores one record to archive memory. The WeatherLink has room in the archive memory for approximately 2/3 of a day of weather data for each minute in the archive interval. For example, if you use the 1 minute archive interval, the WeatherLink may store approximately 16 hours of data. If you use the 30 minute archive interval, the WeatherLink may store approximately 20 days of data. If you use the 2 hour archive interval (120 minutes), the WeatherLink may store approximately 80 days of data.

Note: To aid you in determining when you need to download, the software shows you what percent of archive memory is full whenever you download data.

When the archive memory “fills” the WeatherLink overwrites old data each time it stores a new record. Make sure to download data before your archive memory fills or you will have gaps in your database. It is best to select the longest archive interval which suits your purpose.

Database

The database is the permanent record of data stored on disk. When you download, the software transfers all information in the archive memory to the computer and writes the information into the appropriate database files. As the software writes the data to database files, it calculates the average wind chill and the average dew point during the interval.

The software stores data to disk in monthly blocks, each of which is a separate data file in the weather station's directory. The name of the data file indicates the year and the month of the data and has a three character file extension which indicates the station from which that data came.

CALIBRATION NUMBERS

To increase performance, the software maintains calibration numbers separately from the weather station. If you do not set calibration numbers from the software, the weather station and software will not “agree” on what the calibration number is. Therefore, you must set all calibration numbers (temperature, humidity, barometer) from the software.

The following explanation of how the station and software determine barometric pressure may help you understand this better.

The weather station actually reads atmospheric pressure not barometric pressure. When you set the barometric pressure from the station, the station automatically calculates the difference between the barometric pressure you enter and the atmospheric pressure it reads. This difference gets stored as the barometric pressure calibration number. When displaying the barometric pressure, the station reads atmospheric pressure and adds the calibration number to determine barometric pressure.

When you enter barometric pressure from the software, the software calculates the calibration number and stores it in the weather station's memory (in the same way it would if you set the barometer from the station) and in the open station's configuration file. In this case, both the software and station "agree" on the barometric pressure calibration number.

If you enter a new barometric pressure from the weather station, nothing gets stored in the station's configuration file. The calibration number in the software now differs from the calibration number in the station, and your readings and database will be incorrect.

Note: The software does not support wind speed calibration numbers.

AUTOMATIC DOWNLOAD

The automatic download feature allows you to specify the times at which you wish the WeatherLink Software to download data every day. At the specified time, the software will prompt you to indicate whether or not you wish to download data. You may choose OK to continue or Cancel to quit the download. If you do not make a choice within 10 seconds (if your computer is unattended, for example) the software automatically downloads data.

In order for the software to perform the automatic download at the specified time, the computer must be on and the software must be running. If you have a remote connection, the software automatically dials and hangs up the connection for you. An entry is made in the log file (see "View Log" on page 28) to indicate whether the automatic download was successful.

Note: The automatic download procedure is disabled if you are actually connected to a remote station at the automatic download time.

Under certain circumstances, the software will actually download data if the current time is less than 10 minutes beyond the automatic download time. This feature allows the software to automatically download data from a station if you launch the software a little later than the automatic download time or if a previously executed automatic download continues past the automatic download time of another station. For example, station 1 is set to download at 12:00 and station 2 is set to download at 12:01. Because the archive memory on station 1 is almost full, it takes until 12:02 before the automatic download of station 1 is completed. Station 2 will still automatically download despite the fact that its automatic download time of 12:01 has already passed.

DATABASE ORGANIZATION

Station Directory

When you create a new station the software creates a station directory (using the first eight characters of the station name, not including any spaces and punctuation) in the root program directory. Inside of this directory, the software will create subdirectories as necessary to contain station-specific files.

▲ \CROP

The \CROP directory contains all crop records for which you are using the software's water management feature.

▲ \DATANOTE

The \DATANOTE directory contains any notes you have entered for database records. In order to assign notes to a specific record, the software must assign its own coded file name (a long series of numbers). If you want to delete a note, it is best to do so from the software.

▲ \PLOT

The software automatically creates a \PLOT directory into which you may store plots, plot templates, and strip chart templates. You may, of course, save plot and strip chart files into any directory you wish.

▲ \DEGDAY

The software automatically creates a \DEGDAY directory into which it stores all PC degree-day information.

Station Configuration File

When you add a station, the software creates a station configuration file (called "station.cfg") in the station directory. Each station has its own discrete setup file which saves the following program settings for the appropriate station.

▲ Station Settings

▲ Serial Port Settings

▲ Archive Interval

This is actually stored in the WeatherLink itself, though it is a station-specific setting.

▲ Calibration Numbers

See "Calibration Numbers" on page 95.

In order to recognize a station's database files, you will need a station configuration file in the same directory as the database files. If you copy database files from DOS or Windows (to share or transfer data, for example) do not copy the station configuration file with them. Copy everything but the station configuration file. To read the files, you will need to **create a new station using the exact same name as the old station** on the computer to which the files are copied. Once you create this station, copy the files into that station's directory. After that, you should be able to read the database files normally.

Database Files

The software stores downloaded data in monthly files. Whenever you download, the software saves database files into the open station's directory. The file name which the software applies to database files indicates the year and month of the data. The three character file extension indicates the station from which they were downloaded. You must make sure that the file extension for the database files matches the first three letters or numbers in the directory name (ignore any punctuation). For example, the database file for April, 1994 from a directory called \HOME (and a station called Home) would be named 1994-04.HOM.

Completely filled database files (that is, containing every possible record for a month) saving data stored at the 30 minute archive interval will occupy approximately 64K of disk space. The file size changes in a linear fashion depending on the archive interval. For example, a completely filled file containing data stored at an interval of 1 minute will occupy approximately 1.92 MB of disk space while the same file containing data stored at an interval of 2 hours will occupy approximately 16K.

You cannot combine database files. For example, if you download half of your April data to one directory and the other half to another directory, you cannot combine the two database files into a single file containing all of your April data. Take extreme care when downloading to make sure the correct station is the open station.

Note: If you do not clear your archive memory, you may be able to download the data into the correct file at a later date.

MODEM STRING

The software automatically enters the following modem initialization string, which should work with most Hayes compatible modems: AT E &M Q V X4 S7=60. The individual components of the string have the following meaning.

- ▲ **AT**
This string precedes all Hayes commands.
- ▲ **E**
Turns echo off.
- ▲ **&M**
Selects asynchronous operation which disables error checking and speed buffering in more sophisticated modems.
- ▲ **Q**
Tells the modem to return result codes.
- ▲ **V**
Tells the modem to return short form result codes.
- ▲ **X4**
Enables result codes 0-7 and 10.
- ▲ **S7=60**
Tells modem to wait a maximum of 60 seconds for remote modem to answer and issue a data carrier.

Note: If you use another communications program after using the modem with the WeatherLink Software, you may need to re-initialize the modem using the modem string expected by the other program.

When you create an export file (see “Export Records” on page 83) the software creates a tab delimited text file. All that means is that the software creates a text file which places each record on a separate row and inserts a tab between each piece of data in that row. If you open the file in a text editor, it will look like this:



You may also open or import the file in most popular word processor programs as a text file. Because the data columns are separated by tabs, you may generally choose any desired font.

- **TECHNICAL REFERENCE**
- *Importing WeatherLink Data into Other Programs*
-
-

HOT KEYS

Main Program Window

Ctrl-A Set Alarms
Ctrl-B View Bulletin
Ctrl-C Station Configuration
Ctrl-D Download
Ctrl-H Hang Up
Ctrl-K Walkthrough
Ctrl-N New Station
Ctrl-O Open Station
Ctrl-P Open Plot Window
Ctrl-S View Strip Charts
Ctrl-T Set Time
Ctrl-U Select Units
Ctrl-W Browse Database
Ctrl-Y View Summary
F1 Context-Sensitive Help

Plot Window

Ctrl-H Hide Variables Box
Ctrl-L Left Gridlines On/Off
Ctrl-O Open Plot
Ctrl-P Print Plot
Ctrl-R Right Gridlines On/Off
Ctrl-S Save Plot
Ctrl-T Time Gridlines On/Off
Ctrl-X Clear Plot
F3 Zoom In
F4 Zoom Out
F1 Context-Sensitive Help

Strip Chart Window

Ctrl-O Open Strip Chart
Ctrl-P Print Strip Chart
Ctrl-S Save Strip Chart
F3 Zoom In
F4 Zoom Out
F1 Context-Sensitive Help

Database Window

Ctrl-D Choose Date
Ctrl-N Add Note
Ctrl-P Print Records
Enter Edit Record
Delete Delete Record
F1 Context-Sensitive Help



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